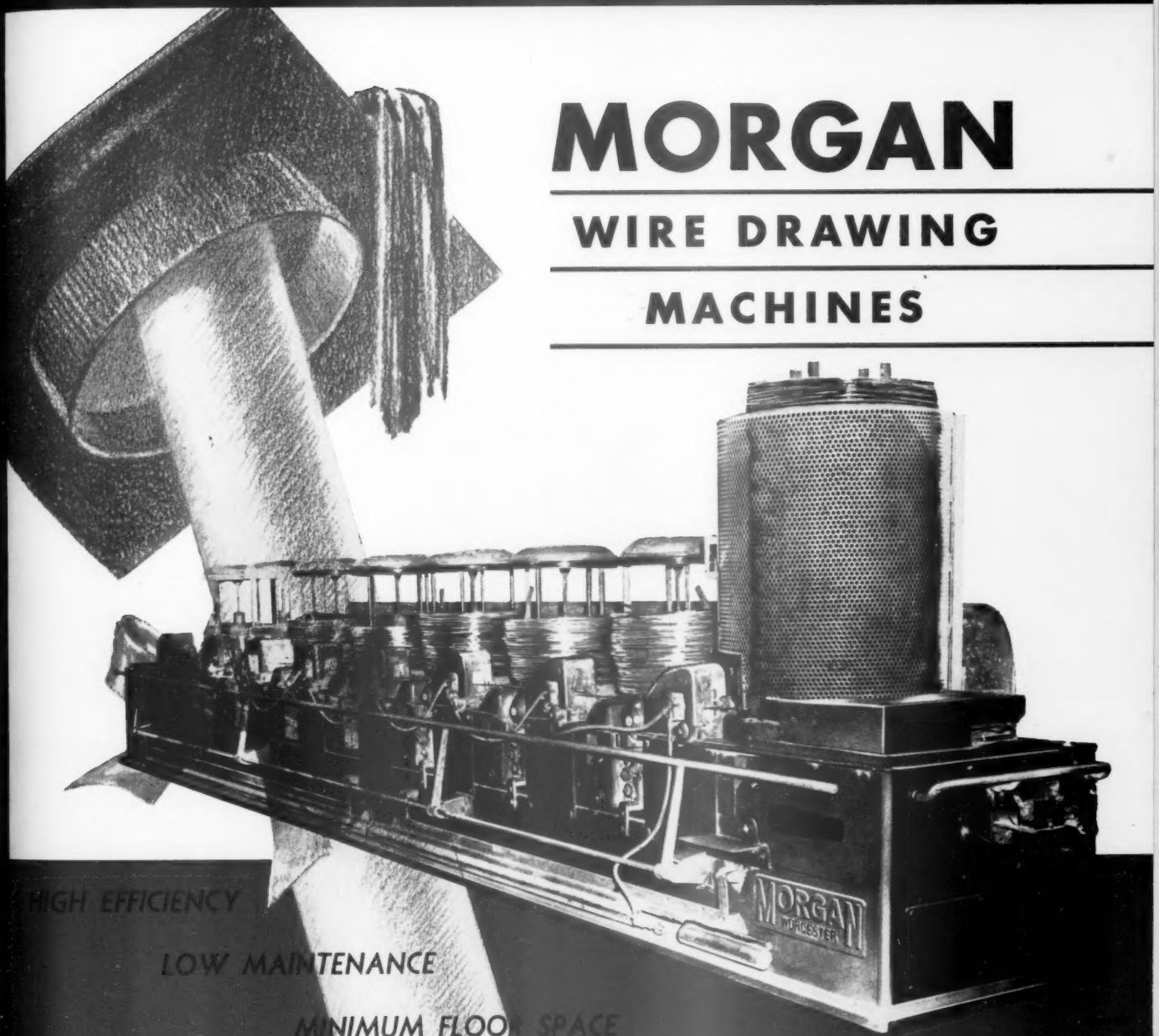
WIRE
AND WIRE PRODUCTS
JUNE



MORGAN

WIRE DRAWING MACHINES

HIGH EFFICIENCY

LOW MAINTENANCE

MINIMUM FLOOR SPACE

MORGAN CONSTRUCTION CO., WORCESTER, MASS.

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

If you anneal, temper, spheroidize, or galvanize wire or rod you should meet with a Lee Wilson sales engineer at your first opportunity.

in wire heat treating and galvanizing big things are happening at Lee Wilson ...

Lee Wilson engineers have made outstanding improvements in rod and wire processing in the past few months: Larger, more accurate and faster heating furnaces that will economically convert any type of stock material to the required specifications; new high production methods of galvanizing and heat treating; new atmosphere controlled patenting. These are only a few of the advancements in wire and rod processing about which you should know.

If you are contemplating the purchase of wire or rod processing equipment it's just good business to check with Lee Wilson before you buy.

Lee Wilson*
ENGINEERING COMPANY, INC.
20005 LAKE ROAD • CLEVELAND 16, OHIO

HIGH CONVECTION ANNEALING FURNACES
MAKE THE BEST METALS BETTER

*ORIGINATORS AND LEADING PRODUCERS O
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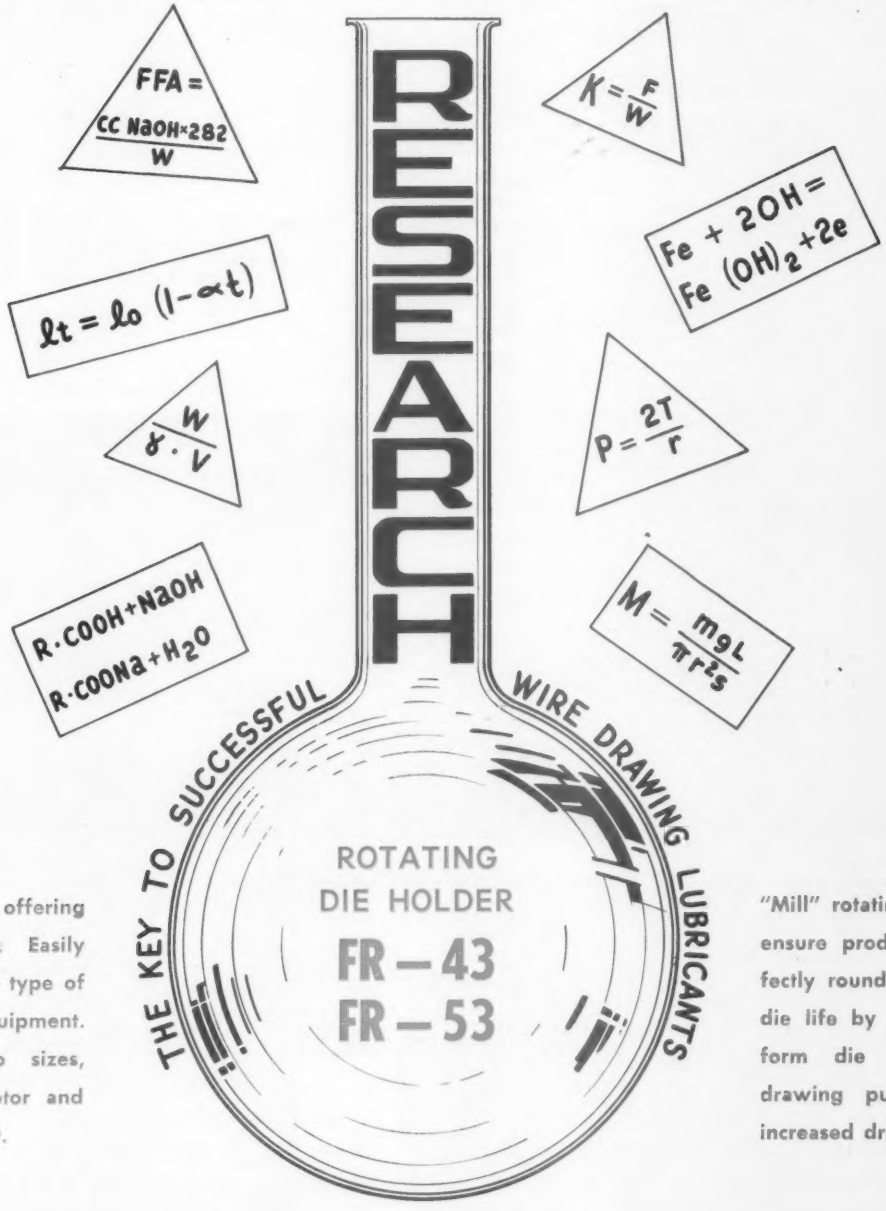
"America's Finest Wire Draw"



Unique devices offering many advantages. Easily adaptable to every type of wire drawing equipment. Available in two sizes, complete with motor and basin for lubricant.

"Mill" rotating die holders ensure production of perfectly round wire, prolong die life by providing uniform die wear, reduce drawing pull and allow increased drawing speeds.

"Look to Standard for the Future"

Cordially yours,

Standard Industrial has pioneered in most of the outstanding contributions to better wire drawing through better lubricants. Consult Standard Industrial for the solution of your difficult problems.

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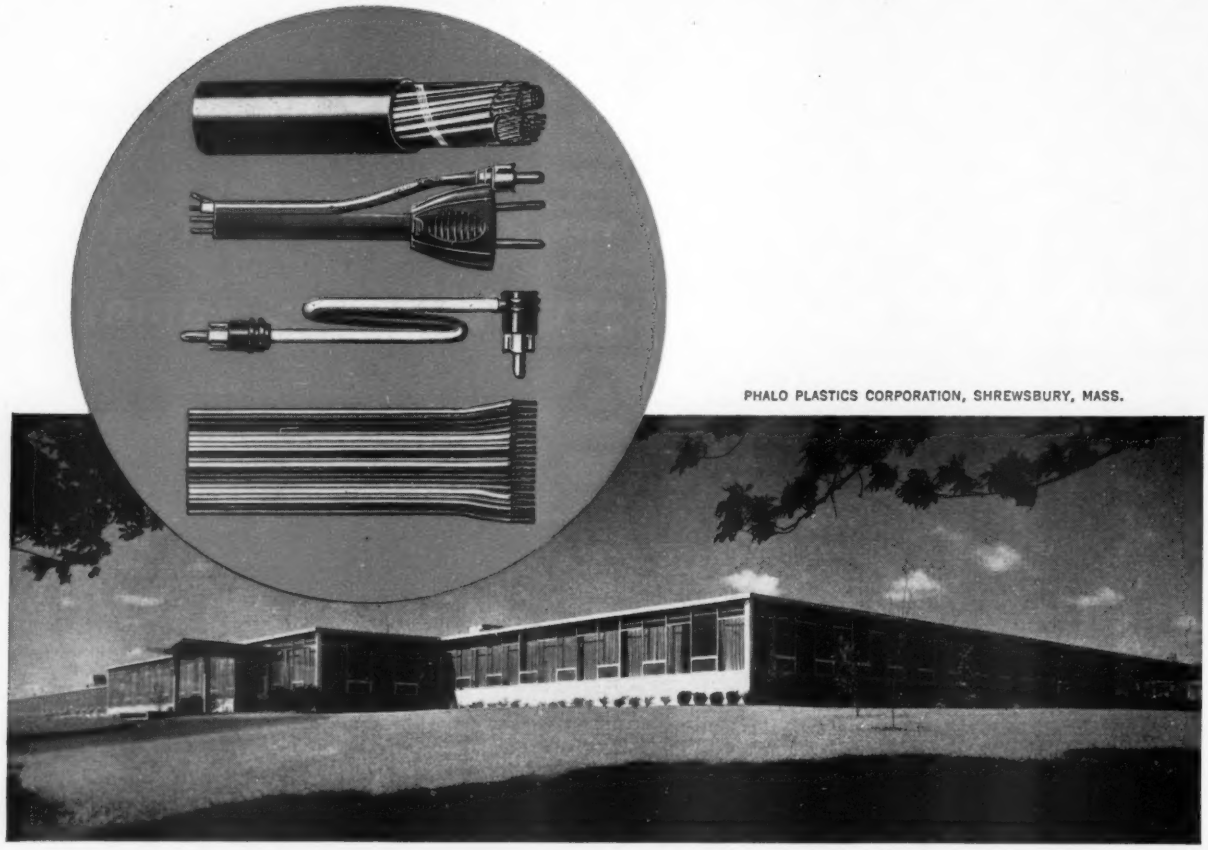


PHALO PLASTICS CORPORATION, SHREWSBURY, MASS.

HOW TEAMWORK PRODUCES QUALITY PRODUCTS FOR WIRE & CABLE USERS

Phalo Plastics Corp., Shrewsbury, Massachusetts, a leading wire and cable manufacturer, and The Blane Corporation, insulation specialists, have teamed together to solve industry needs.

For example, in 1958, the industry required a 105°C Compound having both good high and low temperature properties. To meet this need Blane developed #2105 and Phalo pioneered its use in UL 105°C applications as well as for CSA requirements.

In 1959, Blane's research and development team worked with Phalo's engineering staff to make available to the industry a vinyl insulation material meeting the critical UL tests of 7 days at 113°C in 1/64" wall thickness and 7 days at 121°C in 1/32" wall thickness with a good margin of safety.

The result is Blane's #8100 compound.

We salute Phalo Plastics Corp. for their rigid engineering requirements which assures the industry that only top performing materials will be used in their products.

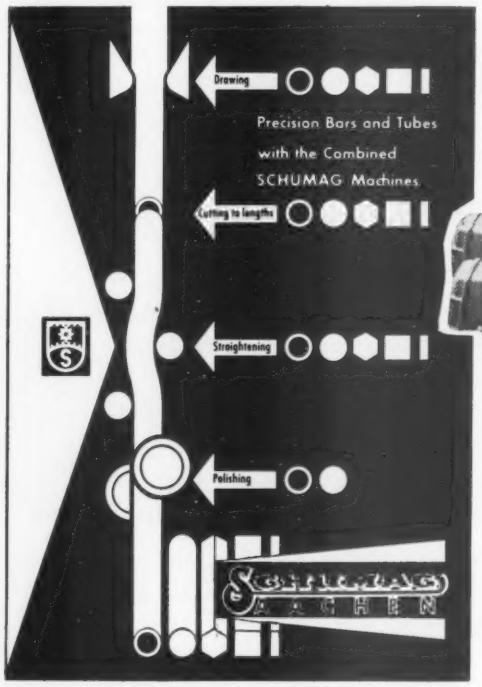
Blane is proud to be one of the suppliers of this progressive company serving the wire, cable, and electronics industries.

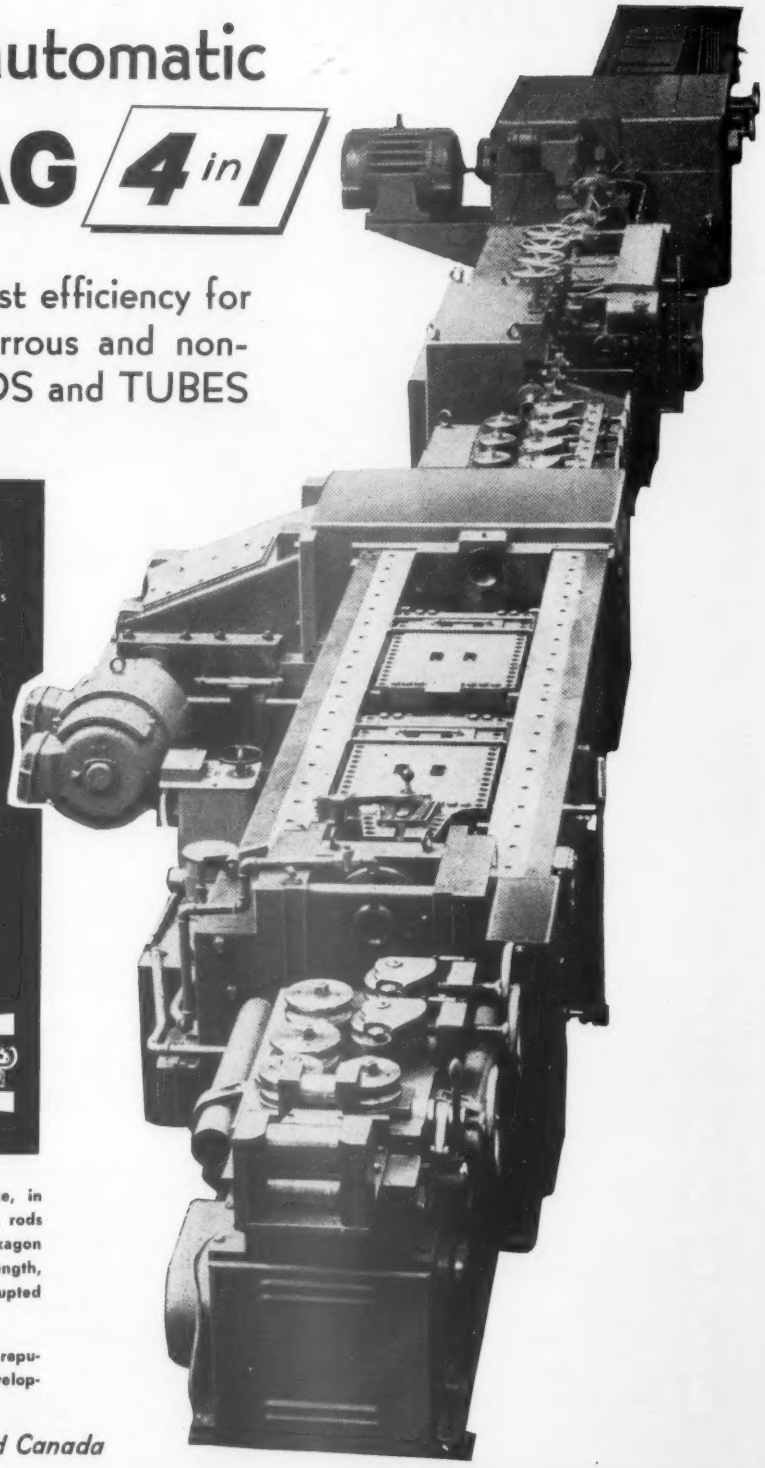
THE BLANE CORPORATION
CANTON, MASSACHUSETTS

BLANE

The fully automatic
SCHUMAG 4 in 1

ASSURES... greatest efficiency for manufacturers of Ferrous and non-Ferrous BARS, RODS and TUBES





- SCHUMAG "4 in 1" machines produce, in one continuous operation, finished bars, rods and tubes from round, square or hexagon material. They will finish draw, cut-to length, straighten and polish in one uninterrupted sequence.
- SCHUMAG "4 in 1" enjoys world-wide reputation as the ultimate in technical development.

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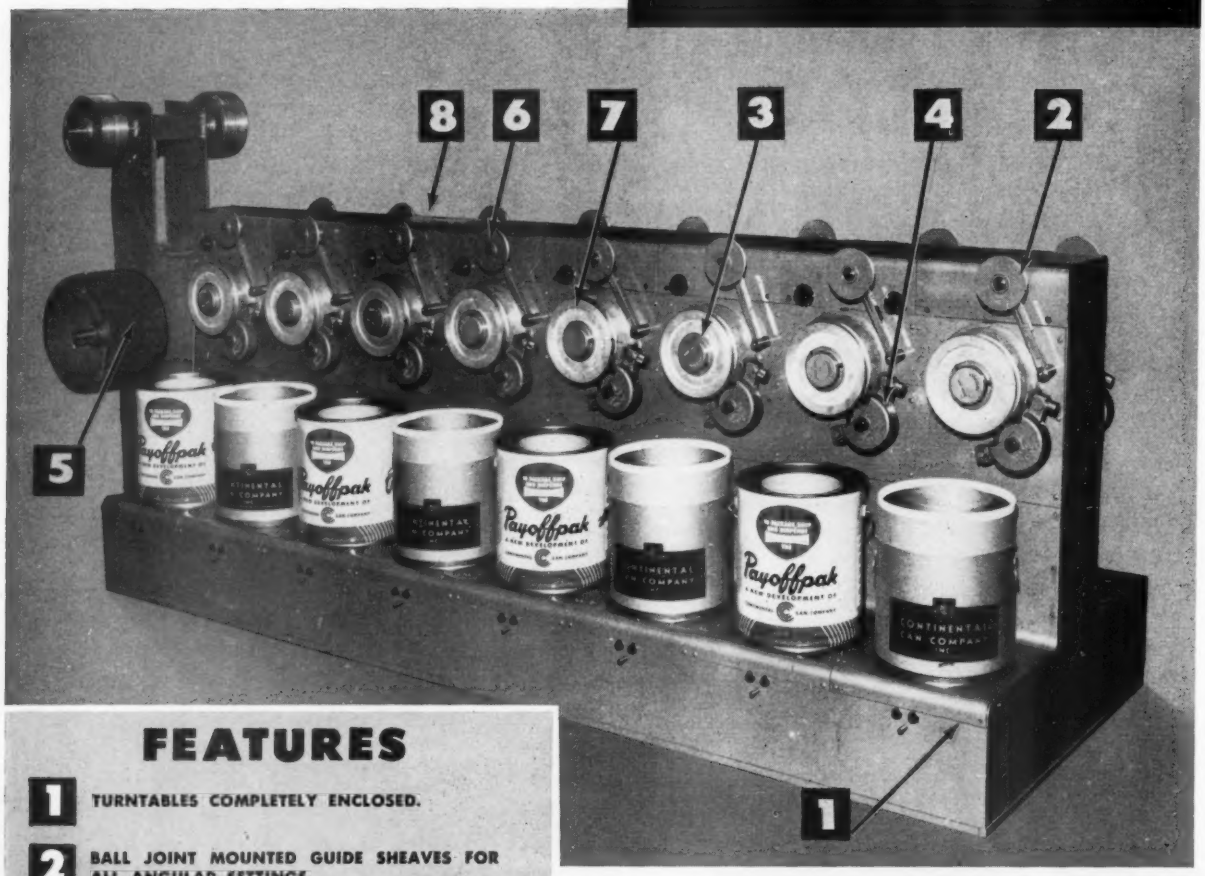
SCHUMAG AACHEN

ANNOUNCING the WYREPAK



FEATURES

1. TURNTABLES COMPLETELY ENCLOSED.
2. BALL JOINT MOUNTED GUIDE SHEAVES FOR ALL ANGULAR SETTINGS.
3. ELECTRO-MECHANICAL TENSION CONTROL FOR EACH HEAD.
4. PRECISION GROUND PRESSURE ROLLS.
5. PRIME RUBBER LAGGED CAPSTAN.
6. ASSEMBLED AND ALL ADJUSTMENTS MADE WITH ALLEN SCREWS.
7. ALUMINUM CAPSTANS, WITH HARD-ANODIZED, POLISHED RUNNING SURFACES.
8. INDIVIDUAL MAINTENANCE ON EACH SECTION.

The drum packaging Take-Up System illustrated, Model S5-TC-S, was designed especially for Magnet Wire.

Other models are made for all types of ferrous and non-ferrous wires.

Advanced engineering and precision construction have evolved in this machine new concepts of speed and efficiency in the packaging of wire. Capacity: Min. size — #32 ga.; max. size — #20 ga. wire.

YOU ARE INVITED TO SECURE COMPLETE DETAILS REGARDING THIS ADVANCED PROCESS FROM —

Advanced Wyrepak Co., Inc.

11 HARRISON COURT PHONE: EDison 4-4274 BRIDGEPORT, CONN.

OR The Vaughn Machinery Co., CUYAHOGA FALLS, OHIO

WIRE AND WIRE PRODUCTS*

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

VOL. 35 JUNE, 1960 No. 6

Designated as Official Publication By The Wire Association

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TWO KINDS OF PEOPLE USE

CAREW

CUTTERS

EXPERIENCED & INEXPERIENCED

THE INEXPERIENCED DON'T KNOW ANY BETTER. THE EXPERIENCED DON'T KNOW ANY BETTER EITHER.

FOR THERE IS NO BETTER

Whether or not you are experienced, you can benefit by our 96 years of experience.

CAREW CUTTERS

are used in wire and spring plants throughout the world.

FOUR SIZES
CUT WIRE TO ¼" DIAM.

made by

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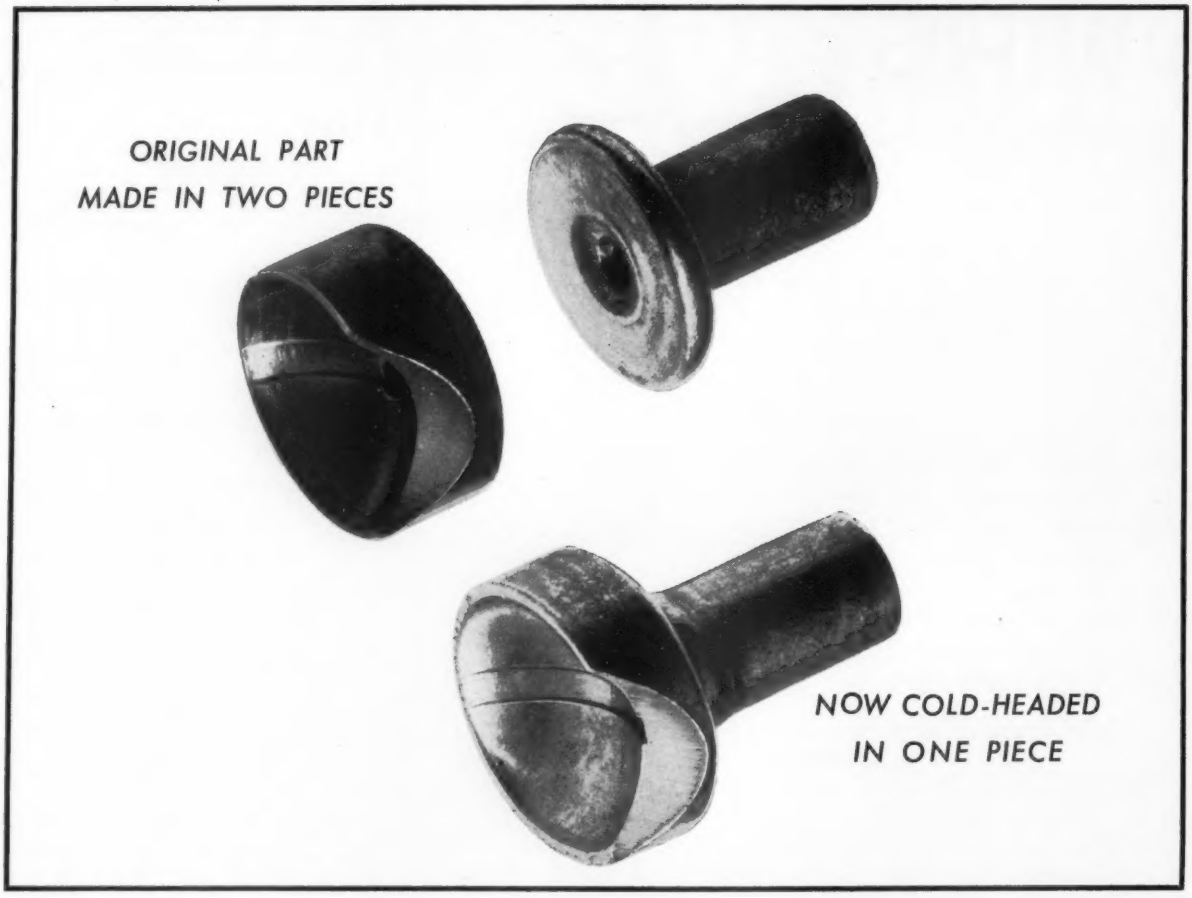
ROCKFALL, CONN., U.S.A.

stocked by most

Mill Supply Jobbers

96 Years of Cutting Wire and Costs



Cold-heading cuts costs— replaces two parts with one!

The two-piece part, comprising a stud and a seat, has been replaced by a single part which is now cold-headed at considerable savings. It's used in the assembly of an automotive steering-rod relay system.

A special type of Bethlehem cold-heading wire was developed for this job. Costs are well under the previous method of manufacture. Cups have good surface finish and high strength.

This is a typical example of the small parts which are constantly under study by manufacturers searching for better materials, improved methods, and lower costs.

Look at these advantages of cold-heading

High-speed production . . . low scrap loss . . . economical stock . . . high strength . . . minimum of finishing operations.

Perhaps your product can be cold-headed

Heading-quality wire, custom-made for the job, has long been a Bethlehem specialty. Our metallurgical engineers will gladly work with you if you have a product that might be cold-headed. For any of your wire needs, call your nearby Bethlehem office, or write us at Bethlehem, Pa.

Steel

For strength . . . economy . . . versatility

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Export Distributor: Bethlehem Steel Export Corporation

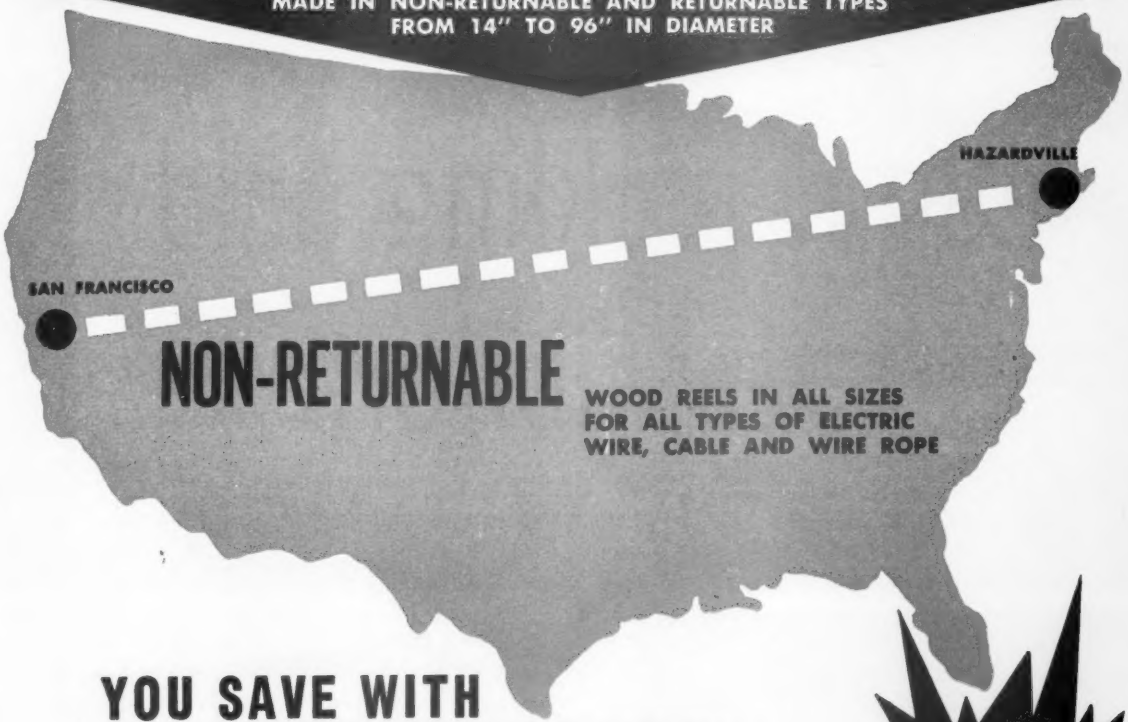
BETHLEHEM STEEL

BETHLEHEM STEEL

A BOARDWALK FROM HAZARDVILLE TO SAN FRANCISCO

The wood used in the manufacture of BRIDGE REELS, in one average year's production, would make a boardwalk one-inch thick and twelve inches wide stretching over 3,000 miles across the country — OR — it would provide enough lumber to build 3,000 six-room houses — THAT'S QUITE AN OPERATION! The important deduction, however, is that BRIDGE REELS for WIRE, WIRE ROPE and CABLE are good enough to meet the exacting demands of most of the big wire plants of the country.

MADE IN NON-RETURNABLE AND RETURNABLE TYPES
FROM 14" TO 96" IN DIAMETER

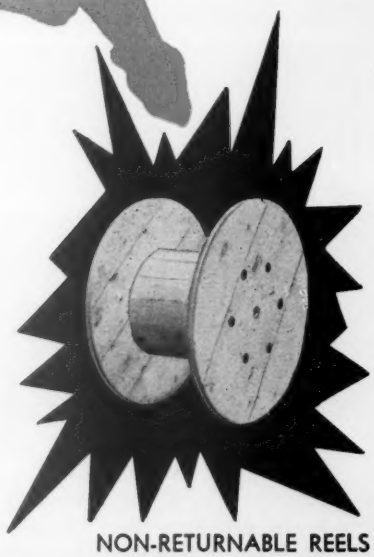


NON-RETURNABLE

WOOD REELS IN ALL SIZES
FOR ALL TYPES OF ELECTRIC
WIRE, CABLE AND WIRE ROPE

YOU SAVE WITH NON-RETURNABLES

- Reduced Reel Investment
- Less Storage Space
- Lower Freight Costs
- No Repair Costs
- No Return Freight Charges
- No Bookkeeping
- No Deposits Needed
- No More Headaches!!



NON-RETURNABLE REELS
GIVE YOU A DEFINITE
PACKAGING COST.

HIGH SPEED

SHIPPING SERVICE IN
OUR OWN TRUCKS

within a radius of 250 miles from the plant. Fast freight will bring you Bridge reels within a few days east of the Mississippi.

"REEL GOOD . . .

Let us quote on your reel needs. Send us your specifications. Better yet, visit our plant and see how and why Bridge reels are made so well at so low a cost.

WOOD REELS"

Facts about pickling acid inhibitors

Nearly 40 years ago Amchem developed the first pickling acid inhibitor—RODINE—and with it revolutionized acid pickling. Only a few of the steel mills of the time believed that the addition of less than one percent RODINE to a sulfuric acid pickling bath could save substantial amounts of acid and metal, while increasing the life of the bath. Today there is no mill chemist who does not know about RODINE and its proven performance in eliminating waste of valuable metal and acid, and its ability to pay for itself through the savings thus gained.

In the past few years much attention has been focused on the use of wetting agents to accelerate pickling. But the fact remains that pickling cycles cannot be reduced by the use of wetting agents alone without severe overpickling problems. Wetting agents do help the acid run off surfaces removed from pickle baths, and, in so doing, reduce carry-over of acid into the rinse.

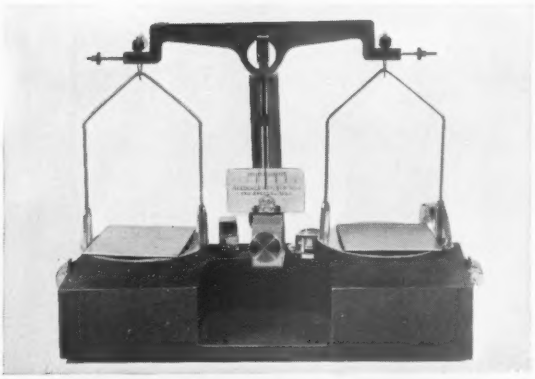
Wetting agents should not be confused with inhibitors to protect the metal and save acid wasted in pitting it. They should not be expected to miraculously speed the removal of scale, even at the expense of wasting the metal. However, the *proper* combination of *real inhibitor* plus correct wetting agent can have beneficial effects on pickling practices.

Only a true inhibitor such as RODINE can offer steel producers solid advantages in pickling. Baths can be operated longer and less acid is required to keep them at desired concentration. Costs of charging and cleaning the bath are reduced, less handling and storing of acid is required. A RODINE bath produces far fewer rejects—steel emerges with uniformly smooth, bright clean surfaces, free of pits, blisters and smut.

When an Amchem Technical Representative enters your pickle house, you can be assured of experienced assistance in improving your pickling. He will recommend the proper RODINE to 1) prevent needless consumption of acid after scale removal, 2) prevent smutting, pitting and overpickling, 3) produce a stable, free-rinsing foam blanket, 4) improve rinsability and reduce carry-over, and 5) produce a brighter, cleaner surface. Only the Amchem Representative can do this for you because he has at his command the most widely diversified and accepted line of real inhibitors and correct wetting agents available.

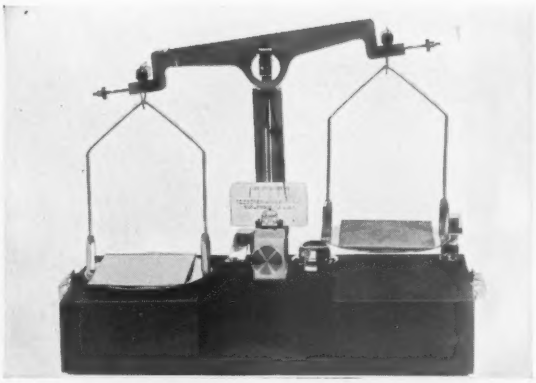
Since the early days of pickling acid inhibitor development, scientists in the Amchem Metal Protection Laboratories have constantly studied methods to make the RODINES stronger, more effective and more economical to use. The RODINES of today, as of 40 years ago, are in a class by themselves, have developed a reputation as *the international standard* in acid pickling inhibitors. The fruit of these years of laboratory research and experience in a highly specialized field, and the assistance of Amchem's trained field representatives—specialists in acid pickling techniques—are at your disposal for the asking.

How Rodine Retards Acid's Attack on Metal

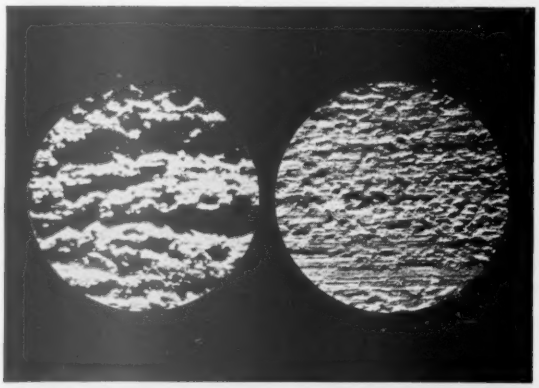


The photographs and microphotographs displayed on this page represent a graphic description of results demonstrating the effectiveness of RODINE in retarding the attack of acid on the metal. NO WEIGHT DIFFERENCE—two identical panels of low-carbon steel are shown being weighed here. They balanced the scale.

RODINE MINIMIZES ACID ATTACK—Each descaled panel was placed in a beaker containing 10% by volume of 66° Bé sulfuric acid of 160° F. The acid in the right-hand beaker was uninhibited. Acid in left-hand beaker was inhibited with RODINE 82, ¼% by volume of the concentrated acid. There was little or no hydrogen evolution in this beaker . . . RODINE retarded the attack of the acid on the base metal.



RODINE SAVES METAL—Both descaled panels were removed from the acid pickle solutions after 5 minutes. The one pickled in the uninhibited acid had lost 1.4% of its original weight. The one pickled in the RODINE-inhibited acid had lost only 0.001% of its original weight. This represents a saving of 26 lb. of steel for each ton pickled; and a simultaneous saving of nearly 50 lbs. of 66° Bé sulfuric acid when RODINE is used to inhibit the acid.



EFFECT OF UNINHIBITED ACID ON THE PANEL — This microphotograph of the low-carbon sheet steel pickled in the uninhibited acid shows deep pits and the crystalline character of the surface after 5 minutes in the solution.

EFFECT OF RODINE-INHIBITED ACID ON THE PANEL — This panel was pickled for 5 minutes in the RODINE-inhibited acid, then microphotographed. Only scale pockets and roll marks are visible; no pitting of the low-carbon sheet steel occurred.

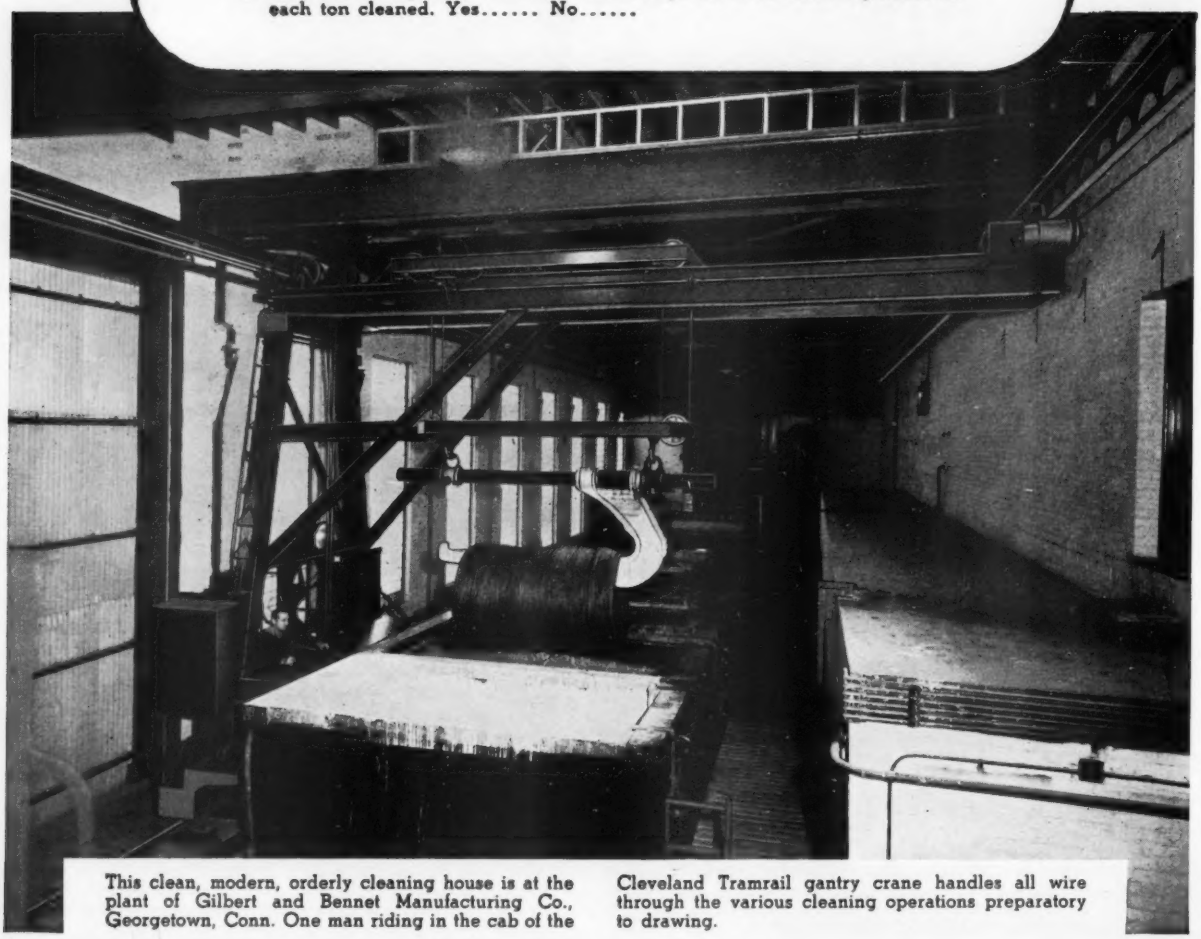
AMCHEM RODINE

Amchem and Rodine are registered trademarks of **AMCHEM PRODUCTS, INC.** (Formerly American Chemical Paint Co.)
AMBLER, PA. • Detroit, Mich. • St. Joseph, Mo. • Niles, Calif. • Windsor, Ont.

Cleaning House Check List

Judge For Yourself How Your Cleaning House Ranks

1. In our cleaning house one man handles all cleaning, rinsing and baking operations for up to 300 tons per turn. Yes..... No.....
2. Our cleaning house is always clean. Yes..... No.....
3. The cleaning house is orderly. Yes..... No.....
4. We have no traffic or congestion problems. Yes..... No.....
5. Maintenance is low. Yes..... No.....
6. Shutdowns because of equipment difficulties are few and far between. Yes..... No.....
7. Less than 10 sq. ft. of total floor area is required in our cleaning house for each ton cleaned. Yes..... No.....



This clean, modern, orderly cleaning house is at the plant of Gilbert and Bennet Manufacturing Co., Georgetown, Conn. One man riding in the cab of the Cleveland Tramrail gantry crane handles all wire through the various cleaning operations preparatory to drawing.

IF THE above reveals that your cleaning house does not rate high, it will pay you to get in touch with Cleveland Tramrail. Many cleaning houses have been converted to models of efficiency with Cleveland Tramrail equipment, and considerable floor space used for the old method released for other purposes.

CLEVELAND TRAMRAIL

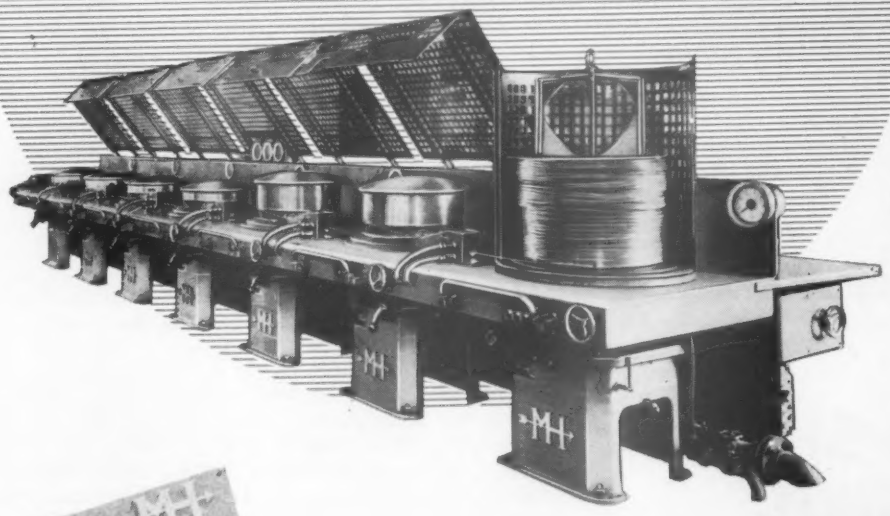
Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 9223 E. 288 ST. • WICKLIFFE, OHIO

THE BEELINE

PRECISION WITH RUGGEDNESS

Ten Block BEELINE DG-4 Designed to Draw 3/8" Aluminum or 5/16" Copper Rod at Finishing Speeds up to 4000 f.p.m.



Seven Block BEELINE DG-4 For Max. 5/16" High Carbon Steel Rod. Max. Finishing Speed 1300 f.p.m.

BEELINE Catalogue
Write for your copy.

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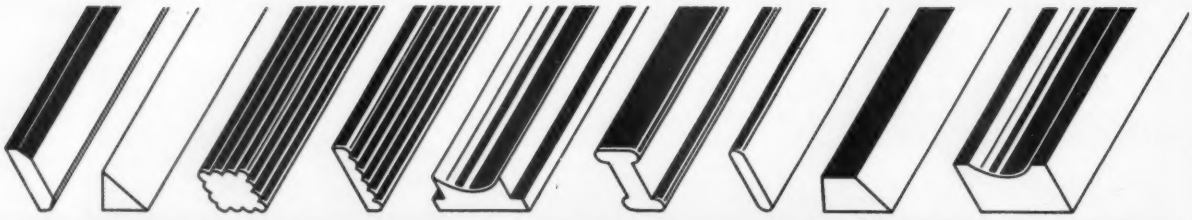
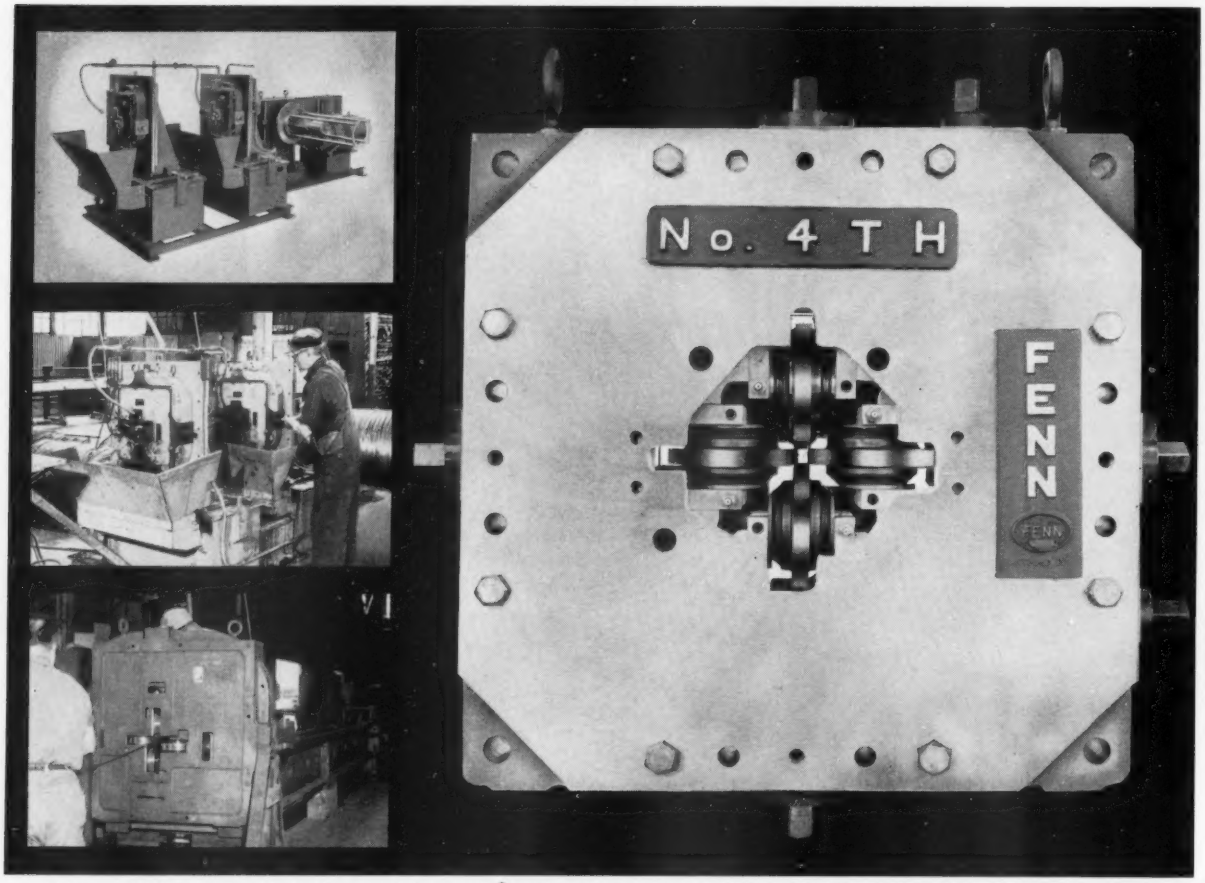
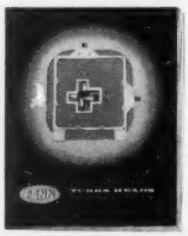




Top and Center — *Wire Shaping Mills with tandem Turks Heads.* Bottom — *Turks Head with Draw Bench.* Right — *Fenn Combination Type Turks Head.*

Wire Shaping with FENN Turks Heads

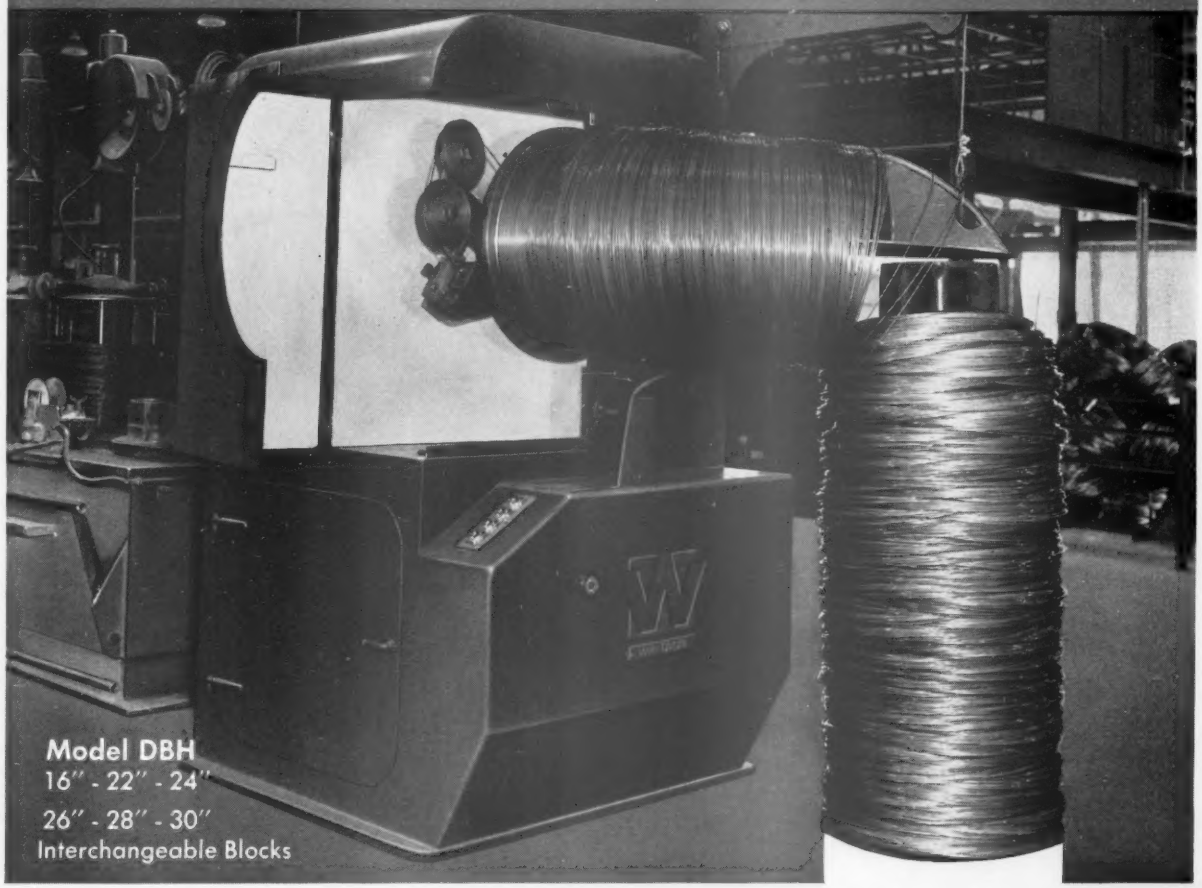
Fenn has pioneered the development of the Turks Head to their present day wide usage for precision production wire shaping. Used on the Wire Shaping Mill (developed by Fenn), on draw benches, or in tandem with Rolling Mills, Fenn Turks Heads produce many precision shapes, both plain and special, such as shown above, with both ferrous and nonferrous wire and rod. They aid in size control, and impart a fine surface finish. Fenn manufactures a complete line in plain, universal, combination and triangular types with bearing capacities at 100 RPM up to 56,400 pounds for heavy reductions. Fenn also makes the important accessories, such as capstans and take-up reels. If it's a wire-shaping problem or requirement, chances are Fenn can help you. Fenn's central engineering department and field engineers are ready to assist you. A copy of the Turks Heads Catalog No. TH56 will be promptly sent upon request.



The Fenn Manufacturing Company, Newington, Conn.

WHITACRE WIRE DRAWING DEAD BLOCK

Water Cooled Die and Block Available



Save with these advantages:

You get continuous increased production because no down time is necessary for stripping...changing dies in a supplying drawing machine..."run down" of accumulation type machines... packaging into stationery container or uninterrupted palletizing on stems... inspection or sampling. There is no tangling nor snarling from handling • Breaks welded in production • No back gearing nor similar mechanism • You save by greatly reduced floor space requirements • Dead block can be located anywhere with wire literally piped from wire drawing machine • Low scrap loss • Increased production through lessened operator fatigue • Design simplicity • Maintenance eliminated except for occasional lubrication of main bearings and motor bearings • Extra large packages for in-process wire • Greatly reduced handling and in-plant transportation costs • Low capital investment.

MODELS AVAILABLE

16" Wire Drawing Dead Block, Model DBM • Model DBH 16" to 30". Model DBXH 30" Wire Drawing Dead Block for heavy gauges and rods including ⅜" • Combination Galvanizing or Tinning Dead Block Take-ups, 16" to 30", Model GF • 26" Heavy Wire Galvanizing or Tinning Dead Block Take-up, Model GFH. Write today for specifications.

APPROACHES
100%
CONTINUOUS
PRODUCTION
EFFICIENCY

WHITACRE CORPORATION

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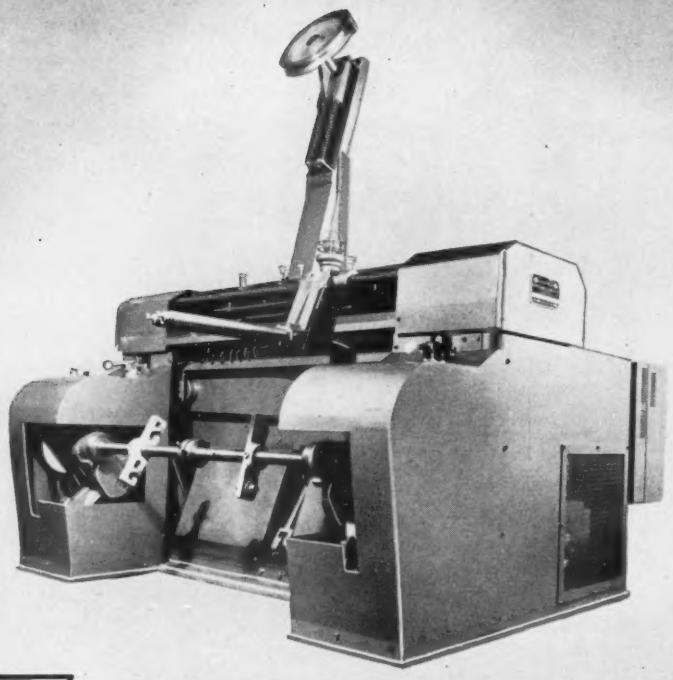
LOOK UP WITH



ENTWISTLE

THINGS DON'T HAVE TO LOOK DOWN BECAUSE OF A TIGHT BUDGET!

This "HOT" little number, of diamond quality, produces rocket performance at an attractive price.

YOU cannot buy any one shaft-type machine elsewhere that approaches the "TE" and "THE" Entwistle Dual Continuous Take-ups either in performance, features, or, as complete at any price. As a matter of fact, non-automatic, "warmed-over" passe' designs, available elsewhere, are in the same price range.

YOU can't afford to miss knowing about our new "TE" and "THE" shaft-type continuous take-ups for reels up to 1400 Lbs. at speeds to 2000 F.P.M.

YOU handle 24" through 36" O.D. reels on one machine.

Obtain full details including firm quotation.

YOU get these built-in features:

- Eddy-current drive and controls.
- Adjustable, maintained speeds and tensions.
- Electric brakes and clutches.
- Pneumatic lift and cut-off.
- Infinitely adjustable traverse, pneumatically reversed.
- Predetermined, Motorized traverse crossover.
- Effortless, trouble free, silent service.
- Includes wire reservoir tower and measuring.

WRITE, CALL, OR FLY . . . BUT — DON'T WAIT.

Ask for Entwistle "3C" — *"The Deal of The Century"*

ENTWISTLE

Manufacturing Corporation

1475 ELMWOOD AVE., PROVIDENCE 7, RHODE ISLAND

Over 40 years of dependable service to the Wire Industry

Europe, South America, Mexico
FOREL EQUIPMENT CORPORATION
30 Church Street, New York 7, New York

British Associates
THE KEMSON ENGINEERING CO., LTD.
Wellington Mill, Bolton Road
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NEW LOW-COST PLASTICIZER

For High Temperature Vinyl Wire Insulation

PX-126

A balanced combination of desirable properties . . . at low cost . . . makes Pittsburgh PX-126 (Ditridecyl Phthalate) a superior plasticizer for vinyl insulation compounding. Formulations made with PX-126 exhibit *outstanding:*

- Retention of elongation
- Retention of tensile strength
- Resistance to chemical breakdown
- Resistance to water immersion
- Resistance to oil immersion

If you have a vinyl insulation compounding problem or you would like to discuss plasticizers "in depth," call or drop us a note on your letterhead . . . and watch things happen *for you!*

1903

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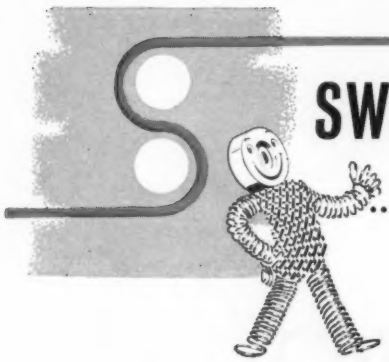

SWIFT'S ANTI-FRICTION ACTIVITIES

FREDDIE F. REPORTS ON:

More feet per minute on hard-to-work metals

Fleximet M2DS is engineered for tough drawing jobs: lubricating mechanically descaled rods and drawing high manganese steels.

It is a rich, fused di and mono metallic stearate compounded for use directly in the die box to produce a dry, hard, semi-glossy to bright finish. With efficient descaling, this specialized lubricant should considerably extend die life and make possible multiple drafting at speeds up to 2000 f.p.m.

WRITE FOR BULLETIN 45

FLEXIMET* M2DS

METALLIC COMPLEX LUBRICANT

Containing an additive to promote bond where no precoat is used

TAKE ANTI-FRICTION ACTION with versatile FLEXIMET* products—developed to serve your industry better

For drawing heavy gauge . . .

FLEXIMET MCA

A high titer calcium stearate complex for high speed multiple-hole draw benches. *Write for Bulletin 24.*

For dry drawing or hot dip-dry film lubrication . . .

FLEXIMET S

Exceptionally rich 80% sodium stearate with rust inhibitor and bonding aid added. Outstanding lubrication with either phosphate or borax precoat. *Write for Bulletin 26.*

For cold heading . . .

FLEXIMET MCL

A lean lubricant. Especially formulated to provide protection and quick release—without excessive build-up on heading dies. *Write for Bulletin 44.*

For versatility . . .

FLEXIMET MCF

A versatile, fine mesh drawing compound for high speed drawing. For either high or low carbon steel, aluminum, stainless, and titanium alloys. Extremely low moisture. *Write for Bulletin 25.*

For high heat stability . . .

FLEXIMET PCM

Fortified with extreme pressure additives to provide a protective, non-reactive coating which remains stable even after being subjected to stress relief heat treatment. *Write for Bulletin 46.*

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105TH YEAR

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To Serve Your Industry Better

S-71

10 STAGE COLD FORGING

KEYSTONE FORGING WIRE WIRE STUDY

Reliable ELECTRIC COMPANY
Franklin Park, Illinois

The cold formed STRANDVISE jaws securely grip the strand supporting pole lines.

Uniform KEYSTONE WIRE meets the demand...

Cold formed jaws that clamp together in a "death grip" hold the strand securely when tension is applied — this is the secret of Reliable's remarkable STRANDVISE®. And the secret of producing quality jaws successfully is Keystone Wire!

The jaws are formed in ten cold forging steps — finish is micro-checked to a tolerance of ±.0015 on smallest chucks. Such rigid requirements challenged Keystone metallurgists to combine the right wire qualities — flowability for extreme forming, uniform temper and close control of diameter on a wide range of sizes. Keystone Forging Quality Wire continuously performs this intricate die forming job, eliminating rejects and waste previously experienced . . . making jaws that will not fail — sharp teeth that bite in and hold. We're proud to have helped Reliable find the solution to a complicated forging operation. We'll be glad to help you, too! Invite your Keystone representative in today for a discussion of your wire problems.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

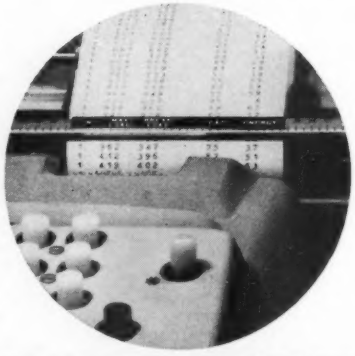
WIRE FOR INDUSTRY

Announcing a unique achievement in the field of quality control and statistical testing . . . **THE NEW INSTRON DYNAMIC DIGITAL SYSTEM**

INSTRON'S new dynamic digital system brings dramatic savings in time and work to the field of materials testing. For the first time, tests can be conducted and recorded at high speed without the need for time-consuming chart evaluation.

This new system selects values of desired characteristics from the load-elongation curve of the material being tested, stores the information in magnetic-core memory units and, on completion of the test, prints them out on a special high-speed serial-entry printer. Total time required for a complete test and printing of results is less than 15 seconds.

The digital system can be programmed to convert extension, energy, load or stress, modulus, yield point, hysteresis and other parameters directly into numerical values, in any units desired. The fast, efficient printer delivers information in ready-to-use form, also provides for totalizing. Digital INSTRON equipment, field tested for over two years, more than doubles testing output. The time-saving features of this system allow larger samplings for more meaningful results. Errors in reading charts and writing down data are eliminated. All the operator does is place the sample in the jaws and push a button. The system does the rest.



The system shown here combines the new digital printout system with an optional strip-chart recorder. Thus, it's two machines in one — offering printed figures for statistical analysis plus the actual corresponding curve for detailed visual study of materials characteristics.

Think about it. Here are new possibilities in volume testing, quality control and statistical analysis. Here is a new system to bridge the gap between manual tabulation of data and high-cost computer operations. Here is the opportunity to do more . . . find out more . . . do it more accurately . . . in less time.

We invite you to send for full information. Just write:

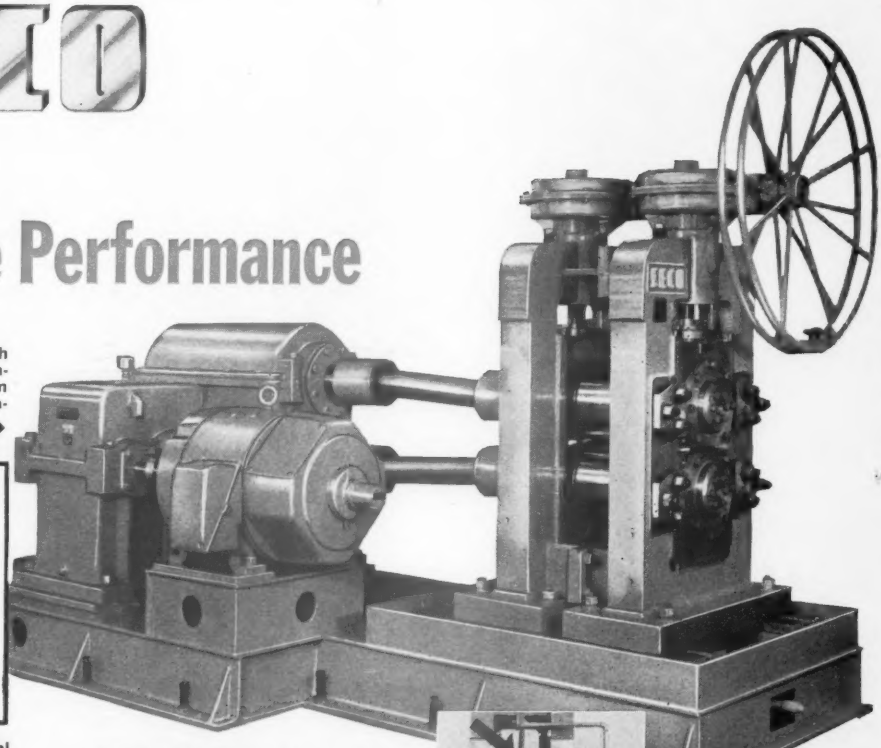
INSTRON
ENGINEERING CORPORATION
2513 WASHINGTON STREET, CANTON, MASS.

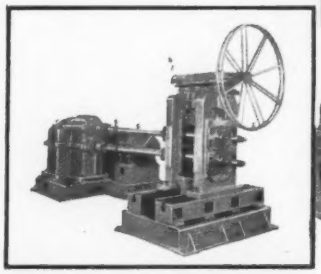
Custom Built
HOT ROLLING MILLS
by SECO
assures
Predictable Performance

Whatever your requirements . . . SECO's staff of trained engineers can help you solve any special Mill problem you may have . . . from creative designing through installation (including *all* required auxiliary equipment).

Should your problem involve a special Cluster Mill (to accommodate either ferrous or non-ferrous metals), or a Hot Rolling Mill that bonds non-ferrous metal to a steel base . . . SECO can supply.

A special, custom-built 2-high Hot Roll Flattening Mill for non-ferrous metals. (Can be built in 2 or 4-high types or a combination of both.) ▶

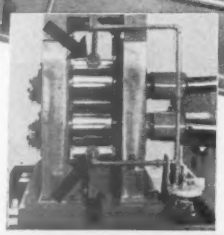




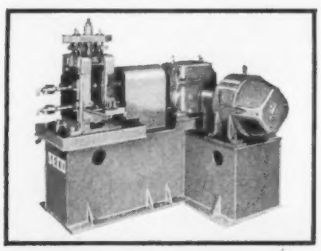
▲ A SECO designed and built Bi-Metal Bonding Mill on movable mountings.

Special Features: ▲

- Water-cooled chocks for lubrication
- 900° F. rolling temperature
- Hand wheel screw-down (adaptable for power)
- Special alloy steel rolls
- Timken Tapered Roller Bearings
- Can be built for 8, 10, 12 or 16-inch widths.



◀ Mill is equipped with two gas jets as a means for pre-heating rolls (see arrows).



▲ A 6-inch, 2-high Wire Flattening Mill for single or tandem use.

STEEL EQUIPMENT COMPANY

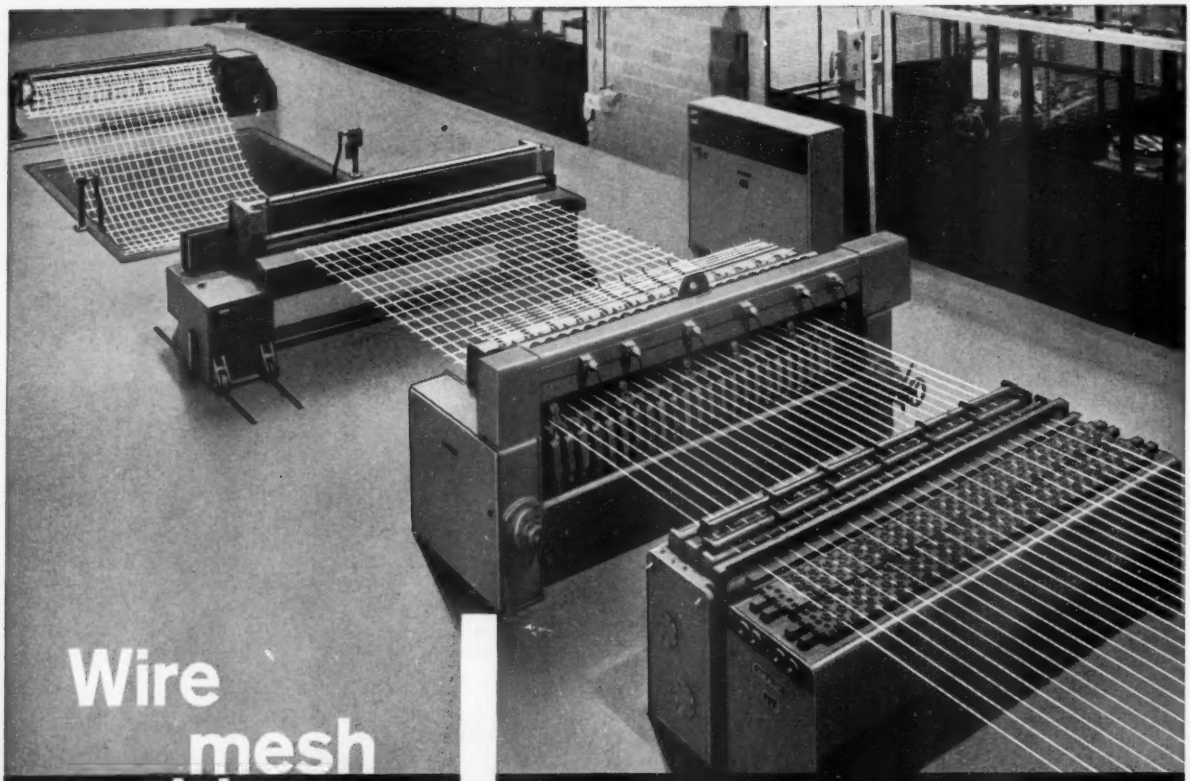
P. O. BOX 737, WARRENSVILLE STATION

CLEVELAND 22, OHIO

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

Affiliated with Lee Wilson Engineering Co., Inc.



Wire mesh welder

for the manufacture of welded fabric sheets and rolls

Advantages of the welder

Quick change from one mesh size to another.
Infinitely variable cross and longitudinal wire pitch for any mesh dimension.
Minimum wear of the large-surface electrodes by suitable electrode shape and material, as well as efficient air cooling.
Maximum power factor of the transformers as a result of minimum inductive losses.
Three-phase connection to the mains supply. Electronic current switching by IGNITRON high-power tubes avoiding current surges.
No tearing of the welded mesh and no electrode burning when feeding bent cross wires since the welder stops automatically in such a case.
Effective cushioning of the carriage impact.
Minimum maintenance and servicing thanks to permanent lubrication of all gliding and rotating parts. Automatic oil fog lubrication of all air presses.
Automatic and interlocked sequence of operations and, therefore, always minimum duration of the total welding cycle.
Electrode pressure at every welding spot and feed power are infinitely variable.
Available with attachment for welding three different and preselectable cross wire pitches.

SCHLATTER

Representative for Canada and USA
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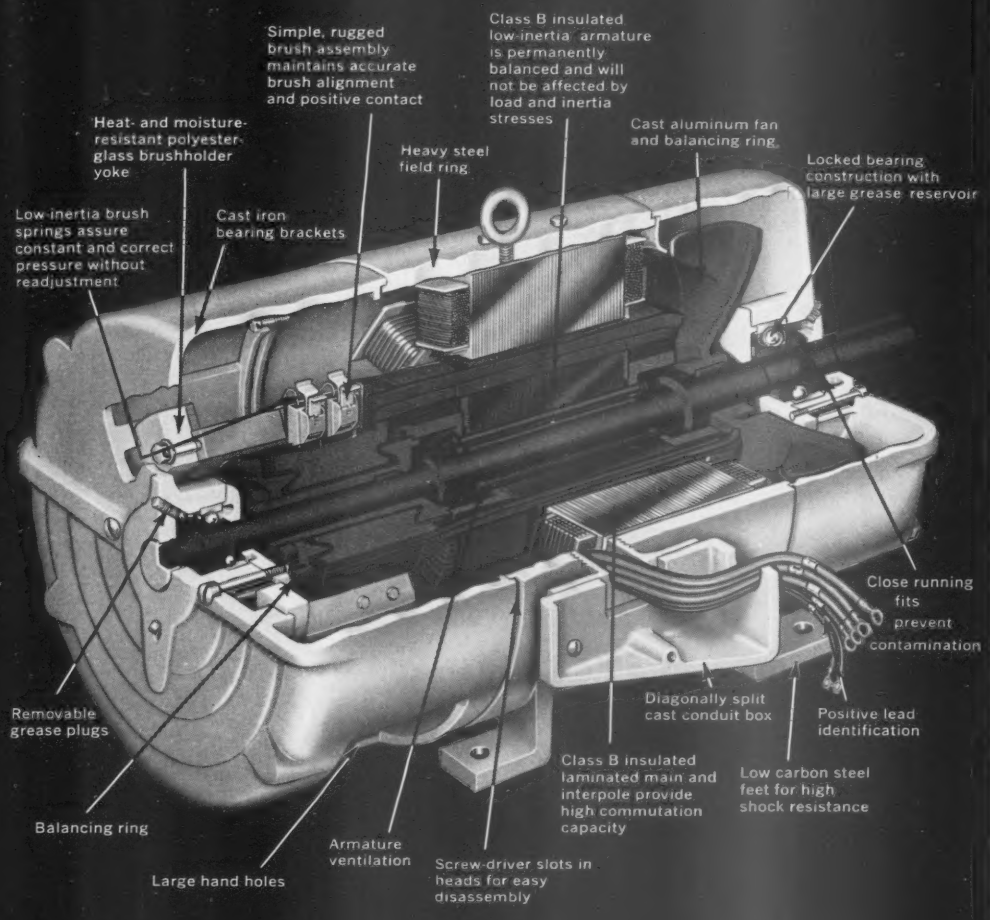
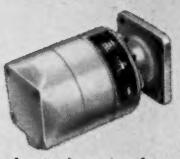
H. A. SCHLATTER LTD. ZOLLIKON/ZURICH
Manufacturers of electric welding machines (Switzerland)

Here's the latest in D-C motor design:


Simple, rugged brush assembly maintains accurate brush alignment and positive contact
Class B insulated low-inertia armature is permanently balanced and will not be affected by load and inertia stresses
Heat- and moisture-resistant polyester-glass brushholder yoke
Heavy steel field ring
Cast aluminum fan and balancing ring
Locked bearing construction with large grease reservoir
Low-inertia brush springs assure constant and correct pressure without readjustment
Cast iron bearing brackets
Close running fits prevent contamination
Removable grease plugs
Diagonally split cast conduit box
Positive lead identification
Class B insulated laminated main and interpole provide high commutation capacity
Low carbon steel feet for high shock resistance
Balancing ring
Armature ventilation
Large hand holes
Screw-driver slots in heads for easy disassembly

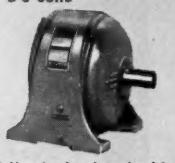
...and some easy-to-add field modifications



A-c tachometer for speed indication

A-c motor-driven blower with permanent dry-type filter for easy mounting on bearing bracket

Magnetic disc-type brake with d-c series or shunt, or a-c coils



Helical single, double, and triple reduction gear units for all ratios

New Louis Allis FLEXITORQ® D-C MOTORS

...offer you vastly improved commutation–low brush wear–400% short-time overload capacity–and unmatched flexibility!

Bear this in mind: The Flexitorq is *not* just another *rerated* d-c motor. It's *all new*—and it's been designed to give you more for your power dollar — in superior performance, matchless field flexibility, and unrivalled economy of operation and upkeep.

Advanced armature design and brush construction offers improved commutation, faster response, and lower brush wear. Class B insulation system provides exceptional thermal endurance... is rated for 60°C rise for continuous duty... and creates a barrier to moisture, acids, alkalis, and other contamination.

The net result to you is reliable, trouble-free power for constant and adjustable speed drives. For example, Flexitorq gives you 400% faster acceleration, plus much better deceleration, reversing, and speed changing. You can safely impose 400% intermittent and 15% continuous overloads — and the high-torque design is a welcome plus when you need extra power for hard-to-start machines.

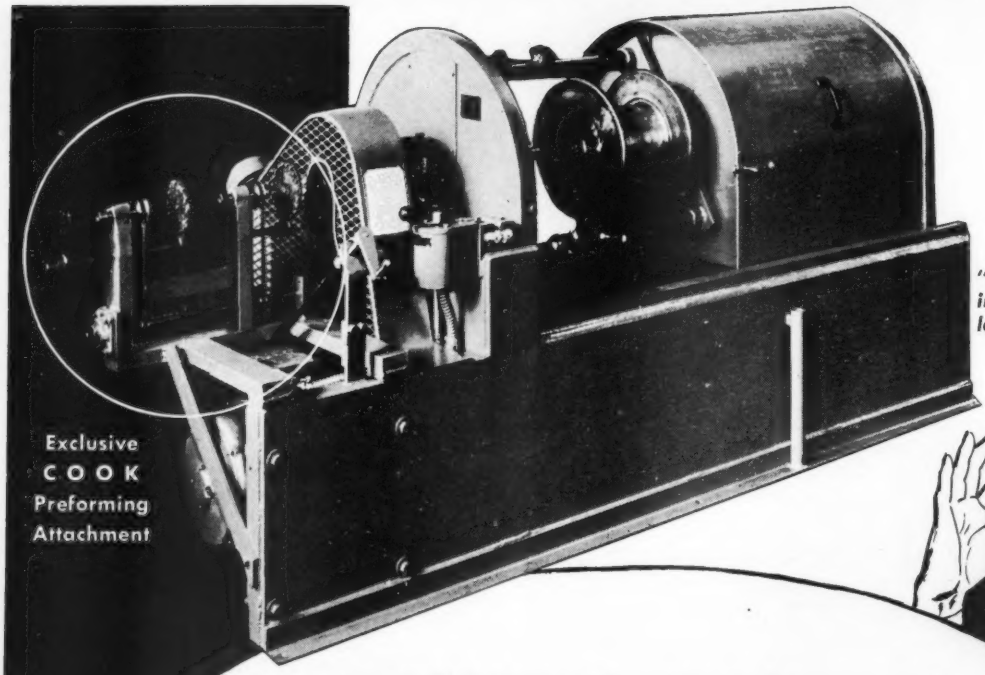
The new Louis Allis Flexitorq is lighter and more compact than previous d-c motors... lets you squeeze more power into less space... yet is actually *easier* to service! Brushes and entire brush-holder assemblies can be quickly inspected and removed without major disassembly. And since brush springs remain conveniently attached to the brush holders, brush changing is a simple affair.

Flexitorq d-c motors are available in sizes from 1 to 400 hp — in various enclosures. See your nearby Louis Allis District Office for information and application help. Or write for Bulletins 3150 and 3200 to The Louis Allis Co., 451 E. Stewart St., Milwaukee 1, Wis.

LOUIS ALLIS

DC-317

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES



Exclusive
COOK
Preforming
Attachment

"My job is to get maximum production at the lowest possible cost"

"I've checked plenty of bunching machines . . . but

only COOK bunchers can make perfectly concentric wire!"

All capacities from 45 lbs. to 1000 lbs. All reel sizes from 8" x 6" up to 30" x 11" based on solid copper wire

Now you can speed up production . . . cut the cost of insulating material and labor

The single twist design and large take-up reel are only two of the many outstanding features of COOK bunchers. The single twist principle insures perfectly round bunched wires* at high speed while the **large** take-up reel provides more practical wire packaging sizes for extra long extruder runs. Both these innovations reduce material waste and down time at the extruder.

For production of either concentric wire (with layers of wires in opposite directions of lay) or semi-concentric wire (with layers of wires in the same direction but with different lay to prevent strand locking) you simply can't beat a COOK buncher!

*Bunched wires so perfect that they can pass through an extruding die of only 1 mil clearance

MEET MILITARY SPECIFICATION: MIL-W-5086

Write for free
BUNCHER
catalog sheet

COOK *Manufacturing Co.*

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ASK FOR LITERATURE ON COOK'S HIGH SPEED CABLERS

Large diameter tubing and cables are no problem with . . .

DAVIS-STANDARD ROTATIVE CROSSHEAD EXTRUDERS*

Another Davis-Standard exclusive!

The Rotative Crosshead Extruder solves the problem of poor distribution of compound around the core tube. The internal design of the Rotative Crosshead creates a uniform flow of compound over and under the core tube to eliminate low pressure areas.

Even Wall Thickness around the entire circumference of both tubing and cable insulation.

"Knit Marks" caused by core supports and low compound pressure are reduced to an absolute minimum.

Uniform Coverage is assured throughout entire length of cable or tubing.

The **ROTATIVE CROSSHEAD EXTRUDER** is available in many sizes from 1½ inches I.D. to approximately 6 inches I.D. Excellent results have been obtained on practically all rubber and synthetic rubber compounds and most thermoplastic materials now being extruded.

*U. S. Patent No. 2794213

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MICRO-WELD BUTT WELDERS . . .
the Machine That Made Possible The Continuous Drawing of FERROUS and NON-FERROUS Wire and Rod!

Over a quarter of a century of experience in this highly specialized field has made MICRO-WELD Butt Welders Standard equipment of the American and Canadian wire industry.

MODEL E-1-C
MICRO-WELD BUTT WELDER
Suitable For
Bench Mounting

SPECIFICATIONS

MODEL E-1-C MICRO-WELD BUTT WELDER MOUNTED ON 4-WHEEL TRUCK

Capacity .015" to .050" Diameter Copper—Copper Alloy and E.C. Aluminum.

MICROMETER PRECISION — MICRO-WELD ®

For further information — write or call

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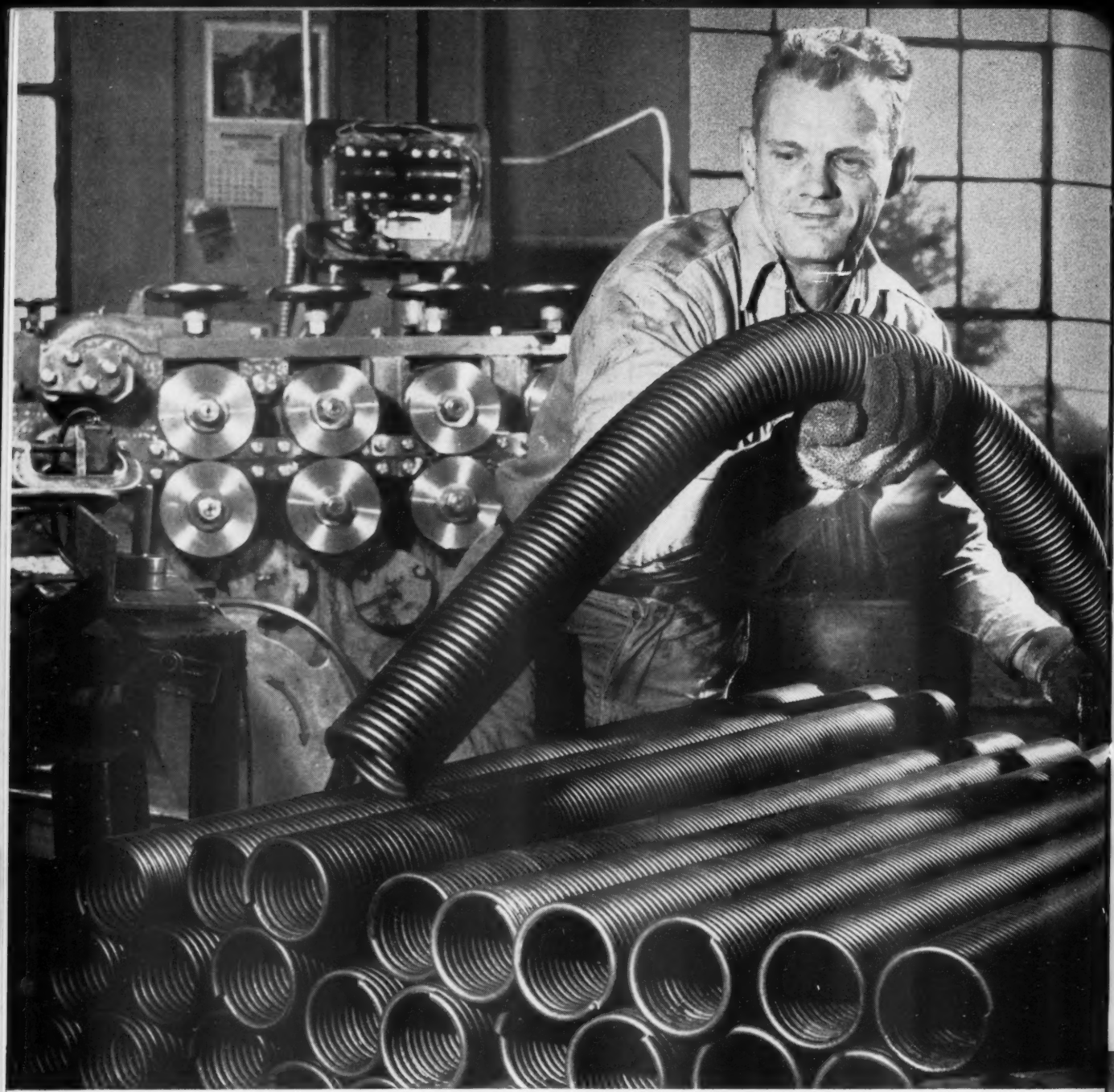
NEW DEVELOPMENTS CONTINUE!

AMERICAN LAUBSCHER

NIEHOFF MACHINE WORKS



Torsion springs for Crawford Door Co.'s Marvel-Lift garage doors are coiled from Pittsburgh Steel Co.'s Oil Tempered MB Wire, from wire .168 inch to .468 inch in diameter.

How Pittsburgh Steel's Wire Makes . . .

Springs That 'Rate'

Crawford Door Co. Depends on Uniformity of Pittsburgh Steel Wire For Precise Engineering of Marvel-Lift Garage, Industrial Doors

Torsion springs which operate Crawford Door Company's garage and industrial doors have to "rate." Here, rate means the force stored up in the spring to supply power for smooth, efficient, finger-tip raising and lowering.

The rate built into any spring—from a 42½-inch long spring on a single car Marvel-Lift residential garage door to a 12-foot long spring on an industrial door—depends on uniformity of wire diameter.

Lack of uniformity throws off engineering calculations and spoils spring performance. Let Elliott Koepfgen, chief engineer for Crawford Door, explain how uniformity of Oil Tempered MB Wire supplied by Pittsburgh Steel Co. helps him design torsion springs to meet pre-determined rates:

"Each of our springs is made to meet a definite rate. This rate is the

Oil Tempered MB Wire from Pittsburgh Steel Co.'s wire mills is checked at Crawford Door plant by M. J. Duffy, plant manager, left, and W. D. Williams, Pittsburgh Steel Co. salesman.

torque which can be exerted in one turn of the spring. It provides the force stored up in the spring to operate the doors. By calculating the diameter of the wire, the number of coils and the number of turns the spring is turned back against itself, we can design a spring with the rate we know is necessary to lift a door of a certain weight and height.

"Uniform diameter is a must since variations would drastically affect spring performance. Uniformity helps us design efficient springs which will last the life of the door. If we overbuild the spring we run up production costs. If we underbuild, we get failures in service and customer dissatisfaction.

"Pittsburgh Steel supplies us Oil Tempered MB Wire we can count on to be so uniform that we can treat wire diameter as a known factor in our engineering calculations."

Here's how it works in two typical designs: for an eight-foot high, 128-pound door in a single car residential garage, Mr. Koepfgen specified a spring made from .263-inch diameter wire. The wire was coiled into a 14.5-pound spring 42¼ inches long with 160 coils. Because the wire was uniform in diameter, each spring made to these specifications had a rate of 60 when the springs were turned back on themselves 7 turns each.

Or take a large industrial door application. For a specially engineered door 12 feet high and weighing 654 pounds, Mr. Koepfgen specified a spring made of .468 wire. The spring was 78¾ inches long, weighed 234 pounds and had a rate of 271 when the spring was turned back 7¼ turns. Because of uniformity in wire diameter, the spring and door combination worked perfectly after installation.

• **Buys 23 gages**—Crawford Door Co. relies on Pittsburgh Steel Co. for oil tempered wire in 23 gages, ranging from .168 inch in diameter for springs 26 inches long to wire .468 inch in diameter, used to coil springs up to 14 feet long.

Uniformity of diameter isn't the only requirement. Crawford Door also insists upon, and gets from Pittsburgh Steel Co., wire with these qualities:

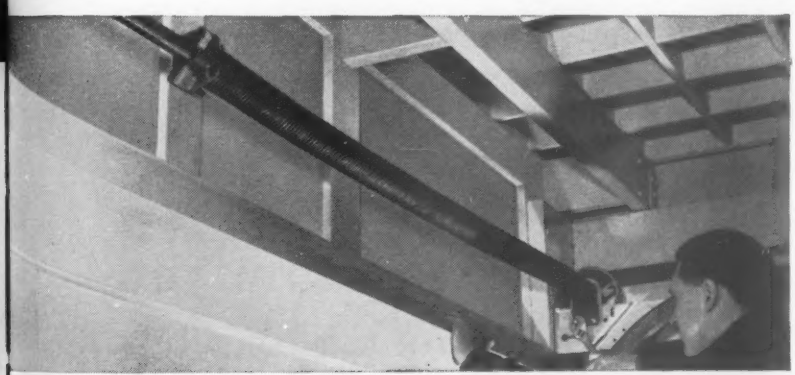
1. Fatigue strength—Springs must have long life without taking a set since garage doors are expected to last indefinitely even in busy places like gasoline service stations.

2. Coilability—Automatic coiling machines can't operate efficiently or economically unless the wire runs through the coilers smoothly. So Crawford wants a good surface free from defects.

3. Proper Temper—Oil tempering and heat treating at the wire mills of Pittsburgh Steel produce wire free from soft and hard spots so that wire can be coiled without bulges which affect performance and shorten spring life.

Plant Manager M. J. Duffy says Pittsburgh Steel supplies wire in shipment after shipment which "gives consistently good results without slowing production or piling up rejects."

Whatever your requirements for manufacturers' wire, whether you're making bobby pins or springs, you'll benefit from the skill and mill facilities which produce wire tailor-made to this customer's specifications. A mill-trained representative is as close as your telephone to help you solve your wire problems or show you how Pittsburgh Steel Co. wire can help reduce costs while improving your product. Call a Pittsburgh man today in the nearest district office.



Installation on garage door. Spring is turned back on itself the calculated number of times and mounted on tubular shaft running width of door. Cables fastened to drums at each side of shaft raise or lower doors. When door is lowered, door weight winds up spring, storing power to be used in raising the door. Lift is applied to both sides of door so it raises evenly, gliding upward in absolutely level position.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
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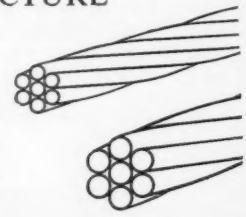
LARGE STRANDS

for prestressed concrete

❀ ❀ ❀

WE ALSO MANUFACTURE

SMALL STRANDS

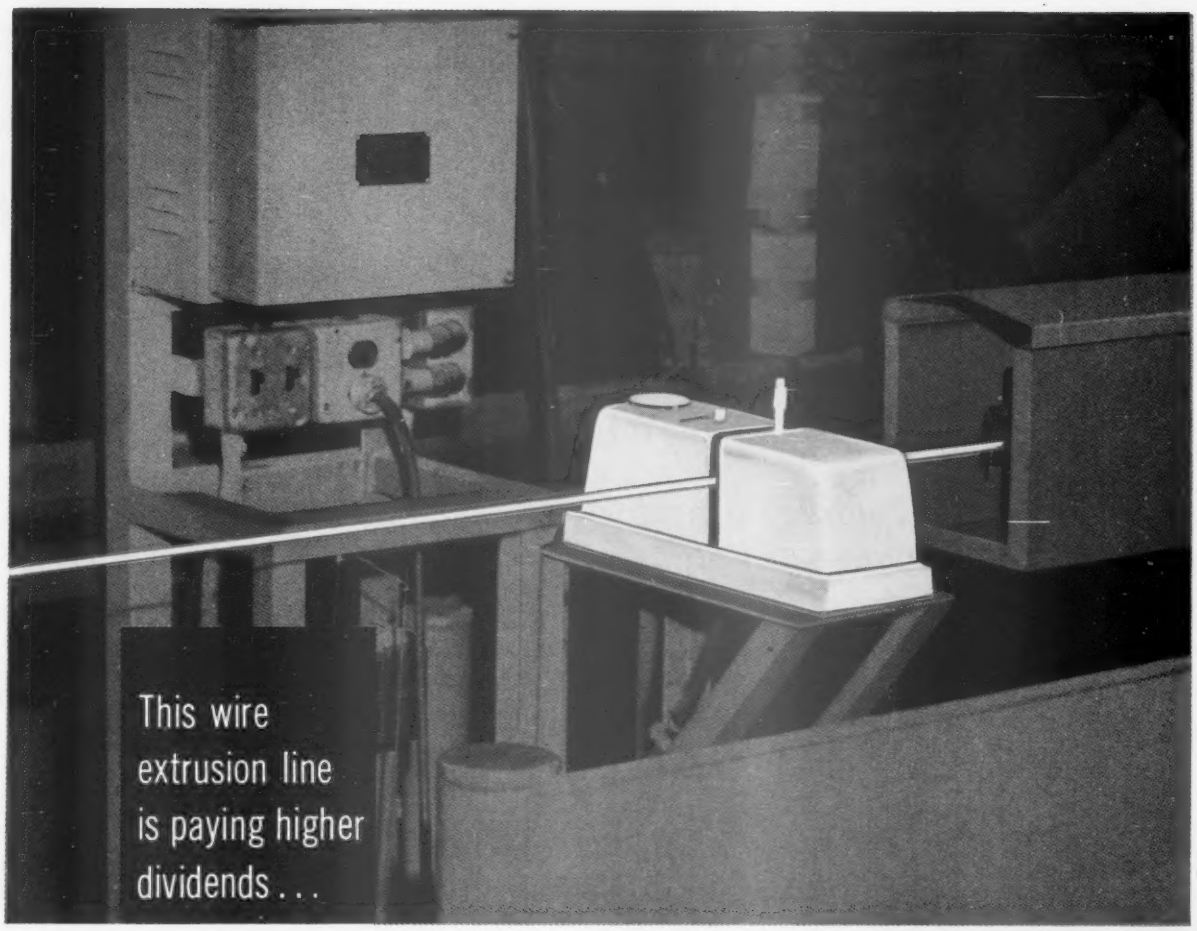


and plain, indented or crimped wires

RYLANDS

Brothers Limited

WARRINGTON
ENGLAND



Read how **YOU** can cut production costs, boost output with **MICROLIMIT CONTROL**

You can easily provide continuous, noncontact gauging and automatic regulation of wire production with the Weston Microlimit Gauge. The instrument offers continuous quality control by measuring wire diameter with sensitive photoelectric cells. Almost instantaneous adjustment of production variables is made through the control console.

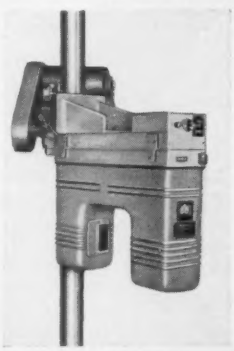
You can save 2% or more on material costs alone, because expense of overcoating is reduced through closer tolerance control, and start-up waste is cut by 50%. At the same time, you can maintain higher wire production speeds.

Weston Model 5110 Microlimit Gauges are used for a host of applications, including thermoplastic and rubber insulated wire, extruded tubing, rods, shapes, and filaments, in sizes ranging from .001" to .750".

Larger Model 5120 Microlimit Gauge is used for wire and cable with diameters from .075 to 3 inches. It is mounted near the die or extruder where material is measured in a highly plastic state.

Contact your local Weston representative for full technical details, or write: Weston Instruments Div., Daystrom, Inc., Newark 12, N. J.

In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 19, Ont. Export: Daystrom's International Sales Div., 100 Empire St., Newark 12, N. J.



Model 5120 Microlimit Gauge

DAYSTROM, INCORPORATED
WESTON INSTRUMENTS DIVISION

Where can I find it?

Look in the BUYERS' GUIDE for your answer

DO YOU have a copy of the 1960 WIRE AND WIRE PRODUCTS BUYERS' GUIDE on your desk for ready reference when you need it?

The 1960 Edition contains literally Thousands of changes — of names, addresses, products, etc.

It will tell you quickly who manufactures all kinds of wire machinery, equipment and supplies; who makes different kinds of rods, bars, wire, wire products, strip, billets; and who produces various types of electric wire and cable.

In addition, in the Year Book section, it gives you:

HISTORY OF WIRE ASSOCIATION ACTIVITIES IN 1959

CONSTITUTION AND BY-LAWS OF THE ASSOCIATION

OFFICERS, DIRECTORS AND COMMITTEES FOR 1960

LISTS OF ASSOCIATION MEMBERS BY INDIVIDUALS AND COMPANIES

INDEX TO ARTICLES AND SUBJECTS PUBLISHED IN WIRE AND WIRE PRODUCTS IN 1959

LISTS OF AWARDS PRESENTED FOR MERITORIOUS PAPERS

Every wire man needs this new BUYERS' GUIDE. It is the only directory in the U.S.A. published exclusively for the Wire Industry—a real gold mine of information!

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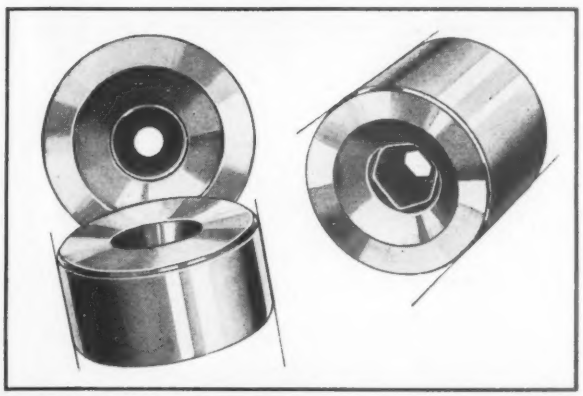
STAMFORD, CONNECTICUT

Metallurgical Memo from General Electric

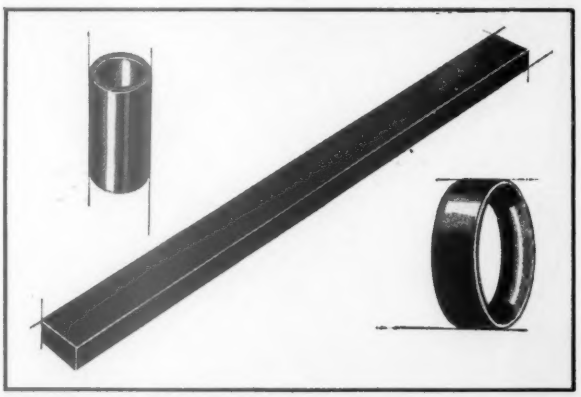
"MOVING METAL" WITH G-E CARBOLOY® CARBIDES

maintains uniformity in size...better finish...less cost per ton with more durable grain structure in the part

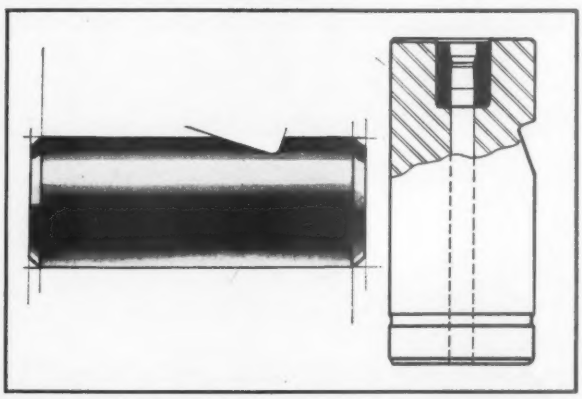
Continuing research by General Electric's experienced metallurgists and technicians gives you Carboloy cemented carbides of highest quality and uniformity—carbides designed to "move metal" at lower cost and with less metal waste. *Metallurgical Products Department of General Electric Company, 11171 E. 8 Mile Ave., Detroit 32, Michigan.*



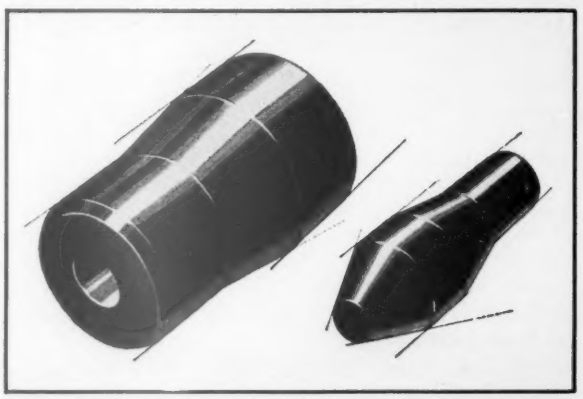
GET MORE WIRE TONNAGE with uniform size and finish. Carboloy carbide wire, bar and tube dies boost product output, permit longer runs with less die wear, minimize downtime. Available in round, square, hexagon shapes.



BOOST WIRE PRODUCTION SCHEDULES by wear-proofing critical parts with G-E carbide wire guide bushings, strips, and guide rings on wire stranding and processing machinery. Last up to 100 times longer in some cases than those made of other materials!



TOP QUALITY AND PERFORMANCE in boltmaking machinery depends on header extrusion dies equipped with Carboloy cemented carbides—which help to produce more uniform parts to closer tolerances; resist stress and strain of the heading and extruding operation.



TUBE DRAWING WITH CARBOLOY MANDRELS provides uniform wall thickness. Tailored to your order, G-E mandrels come in brazed and solid carbide styles. Brazed-type custom-made from standard and special Carboloy nibs. Available from your Authorized Die Distributor or Diemaker.

CARBOLOY®
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT
GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

NOMINAL WEIGHTS OF FINISHED WEATHER-RESISTANT WIRE AND CABLE
Copper & Copper Alloy Conductors
Aluminum Conductors
Conductor Size AWG or Mcm
URC Type Double Braid
URC Type Triple Braid
Neoprene Type
Polyethylene Type
Neoprene Type
Polyethylene Type
Stranded
Solid
This table shows
POLYETHYLENE covere
I HAD THE BOSS UP A POLE...
DON'T GET ME WRONG...I STILL DON'T LIKE STORMS
"But they don't seem to hit us so hard any more.
Not since polyethylene coated wire came along."

TELLING THE POLYETHYLENE WIRE STORY CAN BUILD FUTURE PROFITS FOR YOU

Polyethylene-covered line wire has many advantages for users: Exceptional weather and stress-crack resistance. Easy handling and installation. Long life in service. Fewer outages and minimum maintenance.

We've been telling your customers the polyethylene story in utility magazines through advertisements like those above. And more and more users are specifying polyethylene covering for line wire and many other applications. Why not join us in this effort?

Polyethylene can make your operations simpler, with a more profitable future too.

- The resin comes ready-to-use — nothing to add, no blending, no milling, no post-extrusion vulcanizing. With production based completely on polyethylene, one line replaces several, providing savings in equipment, floor space, maintenance and labor. And there's only one material to purchase and inventory.
- Unlike costs of other insulating materials, which are trending upward, polyethylene price history promises long-term stability. This means polyethylene can be expected to be your most profitable line wire coating in the years ahead.

You can build a solid base for future sales and increased profits by promoting polyethylene line wire now among your customers and prospects.

As you make recommendations, you will find our new data sheet, "PETROTHENE® Resins for Wire and Cable Industry", helpful in selecting resins with the proper balance of properties for different applications. Also available is U.S.I.'s comprehensive 100-page "PETROTHENE Polyethylene . . . A Processing Guide." Write for your copies.

U.S. Industrial Chemicals Co.
Division of National Distillers and Chemical Corp.
99 Park Ave., New York 16, N. Y.

Please send me:

☐ "PETROTHENE Resins for the Wire and Cable Industry"
☐ "PETROTHENE Polyethylene . . . A Processing Guide"

Name_____
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U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers and Chemical Corp.
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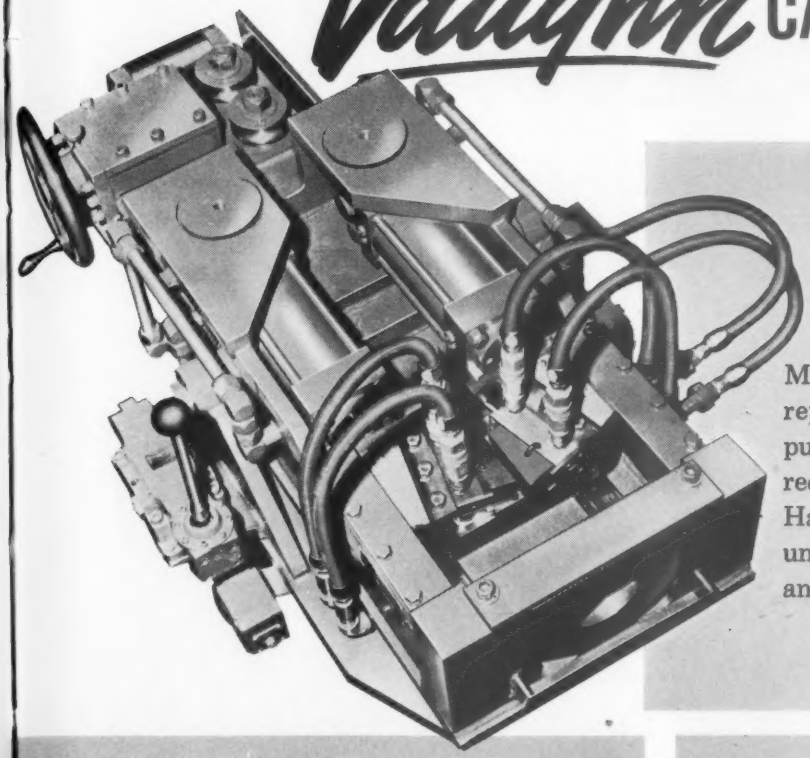
Branches in principal cities

Name your **pointing** and **straightening** needs...

Vaughn® CAN MEET THEM!



New

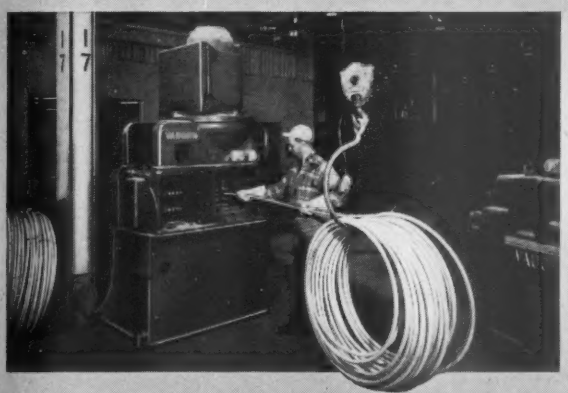
VAUGHN

HYDRAULIC PUSH POINTER

Mounted on the heavy duty Motobloc, replacing the die block, this compact push-type pointer eliminates floor space required for a separate 4-roll machine. Handling rod sizes from ½" to 1¼", the unit is hydraulically operated, and points and pushes rod through die into Motobloc.®

VAUGHN EXTRA HEAVY

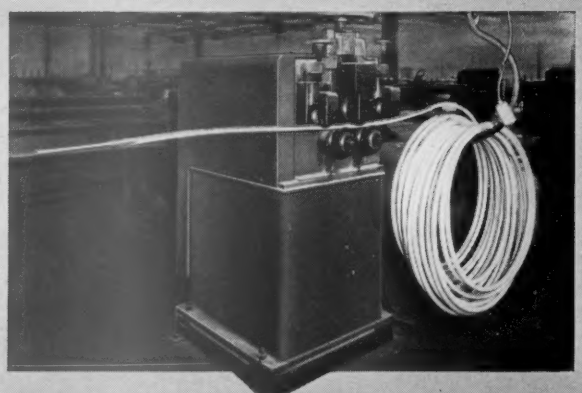
4-ROLL CONTINUOUS POINTER



A specialized unit for heavy service, ruggedly constructed for long useful life. Accommodating rod from ½" to 1¼", this pointer has two vertical and two horizontal rolls—points rod easily without twist.

VAUGHN

ROLL STRAIGHTENER



Mechanically straightening the end of the coil in preparation for moving to pointer and die box, the 3-roll straightener saves time, manpower and money while boosting production. Unit with over-riding clutches is available for use with continuous processing lines.

"Quick on the Draw!"®

The VAUGHN MACHINERY COMPANY

Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

Vaughn Builds

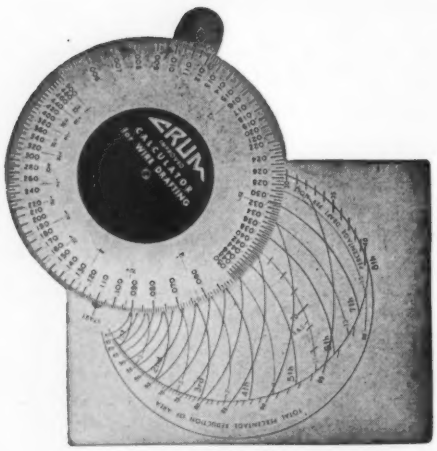
A COMPLETE LINE OF POINTING MACHINES FOR ALL ROD AND WIRE SIZES

Write FOR DETAILS

SAVE SET-UP TIME WITH THE...

CRUM CALCULATOR
FOR WIRE DRAFTING

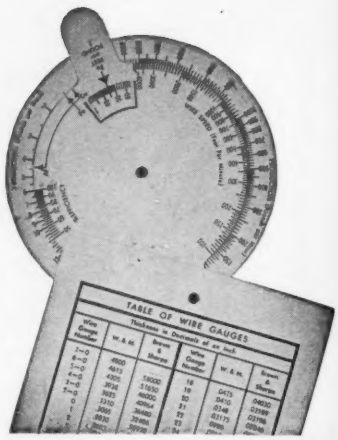
Useful and Accurate!



Front view of Crum Calculator

THIS NEW DOUBLE-PURPOSE CALCULATOR WILL:

1. **Provide quicker and more accurate information on die sizes and reduction areas;**
2. **Calculate wire production rates for various speeds and efficiencies.**



Reverse view of Crum Calculator

SOME OTHER FEATURES OF THE CALCULATOR

- Has new scale for more accurate determination of small percentages.
- Gives readings in B & S gauges.
- Intermediate lines provide reductions for 16 holes in one setting.
- New rectangular shaped back for better protection of calculator.
- More legible % draft-per-hole scale.
- Vinyl plastic construction, resistant to wear, warping, dirt, perspiration, wire drawing soaps—can be cleaned.
- Still fits your vest pocket.
- Handy tables of W & M and B & S gauges.
- Feet per pound calculating scale for steel, copper and aluminum wires.
- Durable, accurate, easy to use.

The improved Crum Calculator is worth its weight in gold in time saving—no laborious mathematical calculations necessary when you use it. Instruction sheet with examples accompany each Calculator. You should have one or more in your wire drawing department.

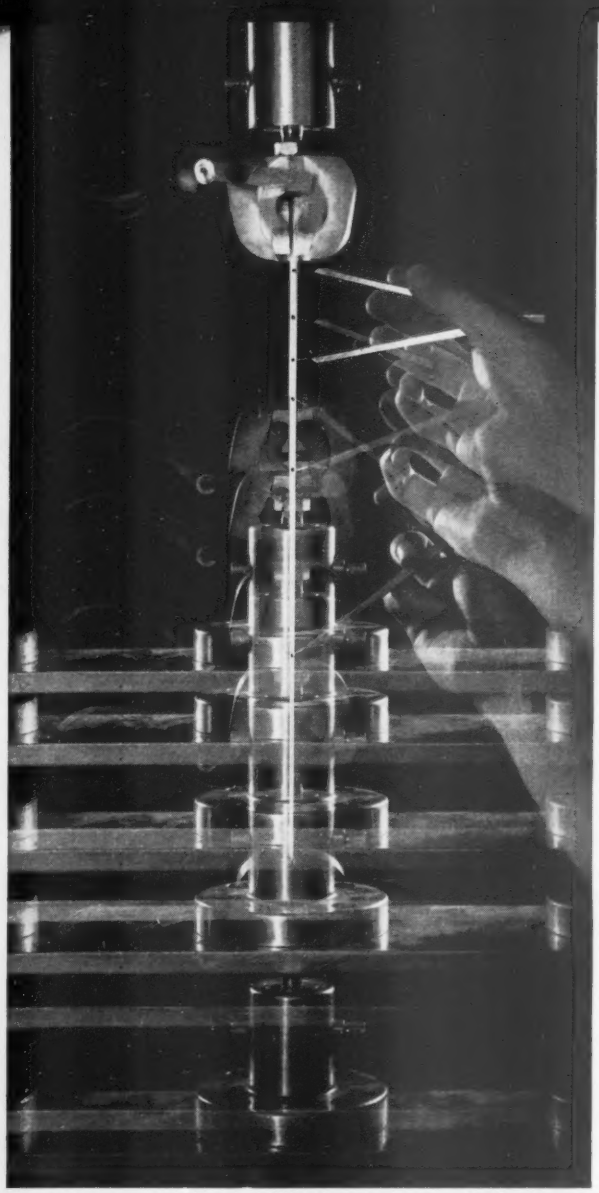
THE PRICE: $5.00 EACH

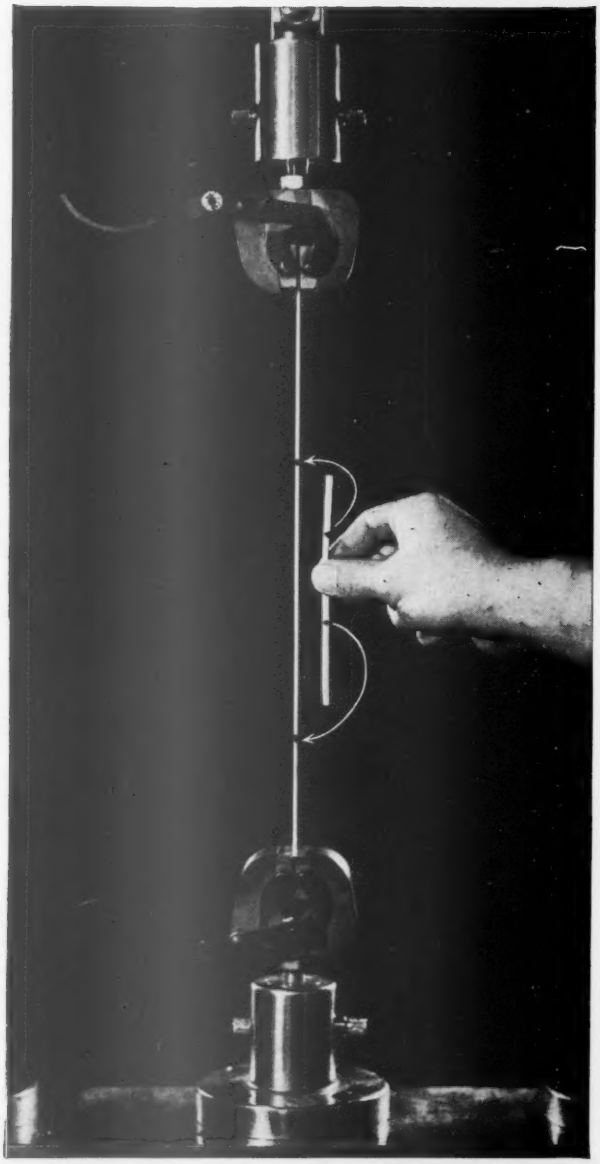
Send your orders to:

WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

(Exclusive distributors)





These photographs show Opalon 1040 insulation, after aging 7 days @ 121°C., being stretched over 2½ times—a retention of 92% elongation of unaged material!

After aging 7 days at 121°C., OPALON® 1040 vinyl insulation retains 92% elongation!

Opalon 1040—UL-approved compound for THW* insulation and jacketing—provides a wide margin of safety in passing UL specifications. These photographs graphically show how. In elongation and retention of elongation after aging—*the major areas where failure may occur*—new 1040 is outstanding.

With a fine balance of electrical and physical properties, and processing characteristics, Opalon 1040 is highly useful for insulation and jacketing for building wire, and jacketing for communication and distribution wire. Its excellent moisture-resistance produces jacketing and insulation that protects against conductor corrosion and oxidation under extreme moisture conditions.

Write for complete technical and processing data on Opalon 1040, to Monsanto Chemical Company, Plastics Division, Room 760, Springfield 2, Mass.

*Under the THW classification, up to 20% more current can be run through conductors than could be with TW conductors. Smaller conductors can be used, saving conduit space, cutting wiring costs. Maximum operating temperatures raised from 60° to 75°C.

Monsanto

MONSANTO ACTIVATOR IN PLASTICS

MIYAZAKI

MODEL
D30-4

NON-SLIP CUMULATIVE TYPE WIRE DRAWING MACHINE

..... Dry-drawing, Double-deck Type.
.....can be conjunction with DC 30 Coiler Block With A Die, therefor, you can add one draft furthermore to a total number of drafts of this, and carry out real Non-stop Drawing.

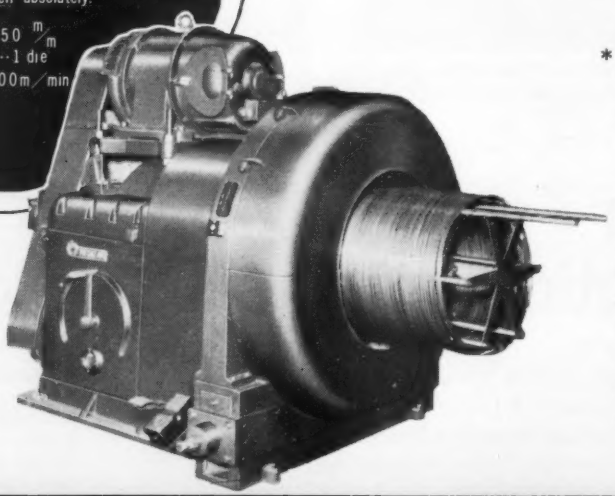
Block Dia. ..... 750 m/m
Number of Draft ..... 7 die plus 1 die (Coiler Block)
Max. Speed ..... 250m/min.
Materials to be drawn ...High Carbon Steel Wire
Drawing Range ..... 9.5 m/m ~ 3.5 m/m

Machinery for the Wire Industry

COILER BLOCK WITH A DIE

.....is capable of drawing and coiling all sorts of wire at the same time.
.....can be conjunction with any type of Wire Drawing Machine now in use at your mill.
.....Possessing a Die and postformer Roller, wound wire is not twisted itself absolutely.

Block Dia. ..... 750 m/m
Number of Draft ..... 1 die
Max. speed 300m/min



MODEL
DC30

MAIN PRODUCTS

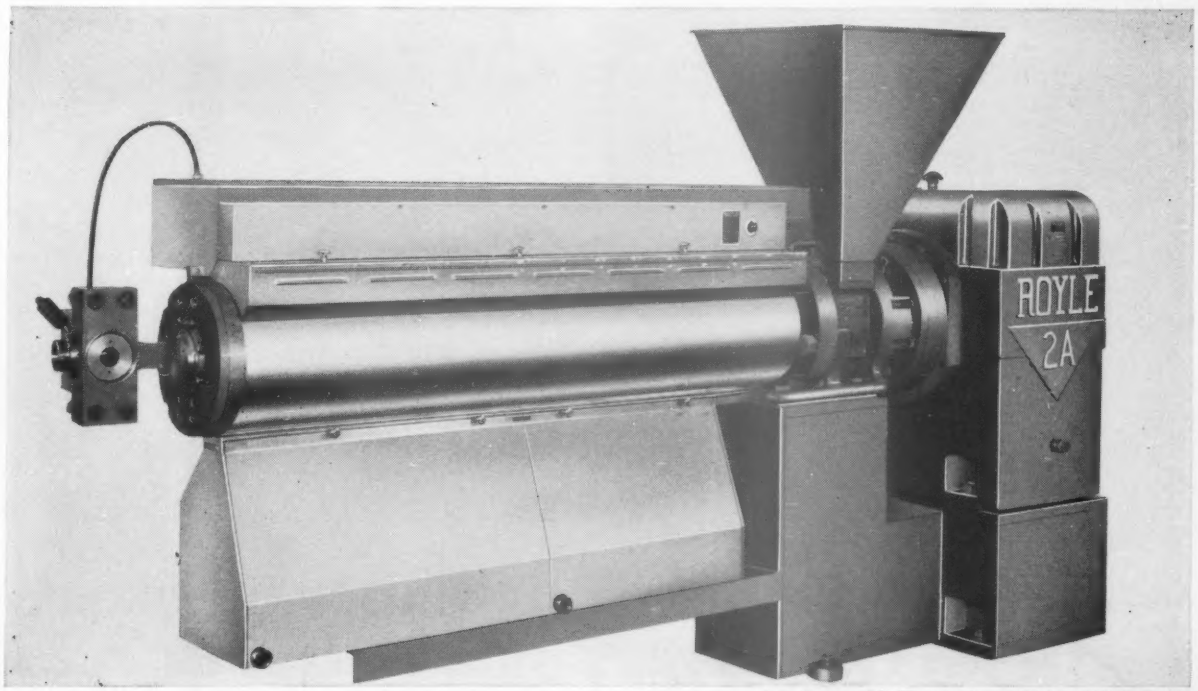
* CONTINUOUS WIRE DRAWING MACHINE (Cumulative or Straight-Line Type)
* COILER BLOCK (With or Without a Die)
BULL BLOCK
SPOOLER
POINTING MACHINE

WIRE STRANDING MACHINE (Tubular or Planet Type)
CLOSING MACHINE
BUNCHING MACHINE
ASSEMBLING MACHINE
WINDING MACHINE
PATENTING TAKE-UP FRAME
GALVANIZING TAKE-UP FRAME
etc .....

Miyazaki Iron Works, Ltd.
Kaizuka, Osaka, Japan.

ROYLE

the world's most popular thermoplastic wire extruder



2A Spirod® Extruder, 4½", 20:1 L/D

MORE ROYLE EXTRUDERS ARE IN USE IN THE WIRE INDUSTRY THAN ANY OTHER MAKE

And with good reason. Whatever your requirements for Thermoplastic Wire—Telephone Wire, Building Wire, High-Voltage Cable, Specialty Wire—Royle has the completely engineered Extruder and Auxiliary Equipment exactly suited for your particular needs . . . for fast, economical production of high quality wire.

Royle Spirod® Extruders have the heating and cooling capacity to process all of the latest Thermoplastic compounds. Even Teflon 100-X—that highly corrosive compound—is being processed daily on many Royle Spirod® Extruders.

Royle Auxiliary Equipment for Thermoplastic Wire extrusion includes:

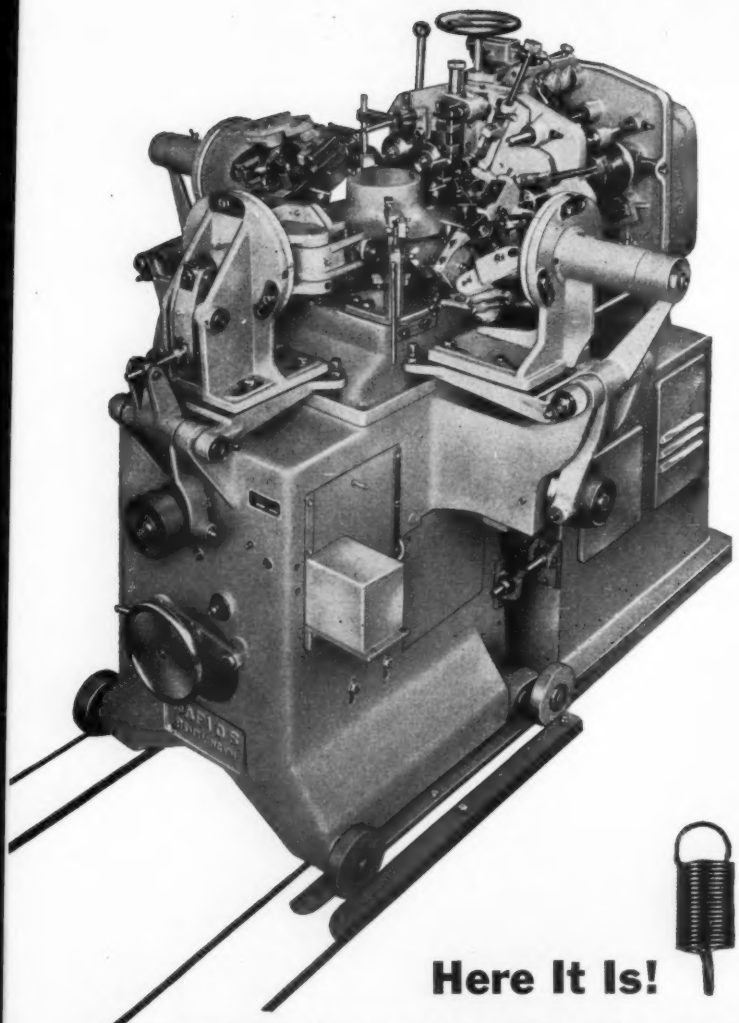
Engineered Capstan Systems
Controlled Cooling Systems
Take-ups
Air Wiper Assemblies
Dry Blend Hopper-Screw Seals
Auxiliary Feed Hoppers

ROYLE
Paterson, N. J.

JOHN ROYLE & SONS

John Royle & Sons, 10 Essex Street, Paterson 3, New Jersey
Pioneered the Continuous Extrusion Process in 1880

Home Office, V. M. Hovey, J. W. VanRiper, SHerwood 2-8262. **Akron, Ohio,** J. C. Clinefelter Co., BLackstone 3-9222. **Downey, Cal.,** H. M. Royal, Inc., TOpaz 1-0371. **London, England,** James Day (Machinery) Ltd., Hyde Park 2430-0456. **Tokyo, Japan,** Okura Trading Company, Ltd., (56) 2130-2149.



AUTOMATIC
SPRING COILING
LOOPING MACHINE

Here It Is!

THE FIRST FULLY AUTOMATIC UNIVERSAL SPRING COILING AND LOOPING MACHINE

for the production of extension springs looped on both ends. The loops can be made parallel or at any angle to each other. The uniformity of placement of loops and length of springs far surpasses results achieved by "old fashioned" methods.

It is not only possible to produce springs with normal loops, half open loops or machine loops, but, also springs having two different styles of loops.

THE ZO SERIES OF COILER-LOOPERS ARE AVAILABLE IN 2 MODELS:

	Model ZO/30	Model ZO/15
Wire diameters	.0197" to .0475"	.0394" to .118"
Lengths of Springs	.750" to 5½"	1¾" to 7"
O. D. of Springs	.200" to ⅝"	.394" to 1"

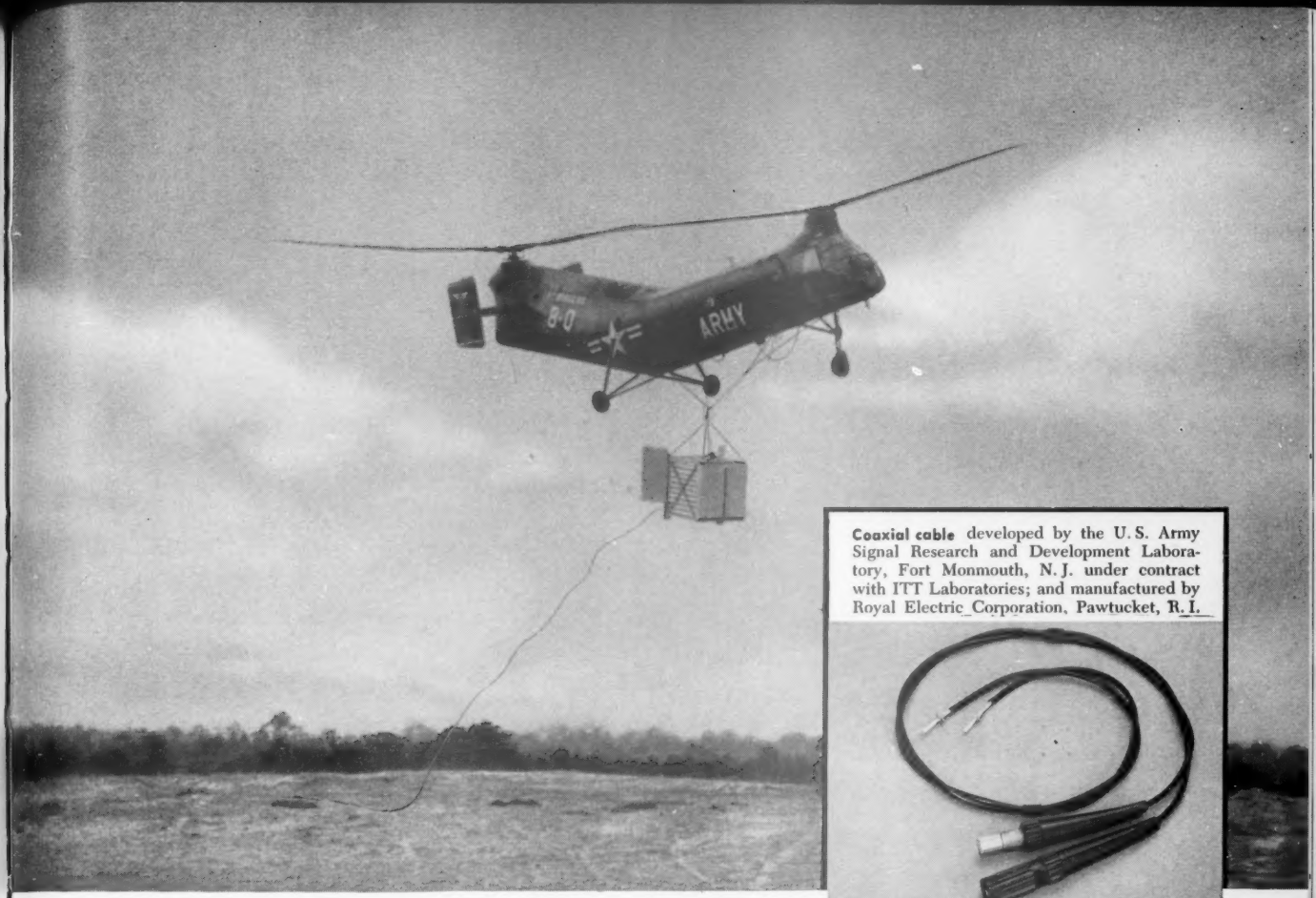
Production on both Models up to 40 complete springs per minute.

WAFIOS

U. S. Office: WAFIOS MACHINERY CORPORATION
61 Hudson Street, Hackensack, New Jersey

Canadian Representative: Mr. O. HRBOTICKY
108 Givens St., Toronto, Canada

WAFIOS MASCHINENFABRIK REUTLINGEN/GERMAN



Coaxial cable developed by the U. S. Army Signal Research and Development Laboratory, Fort Monmouth, N. J. under contract with ITT Laboratories; and manufactured by Royal Electric Corporation, Pawtucket, R. I.

Jacketed with High-Density Polyethylene— Military Cable Laid at 100 MPH!

Modern warfare requires highly dependable, quickly installed communications systems. To meet this demand, the U. S. Army Signal Research and Development Laboratory, Fort Monmouth, New Jersey has developed a new coaxial cable nomenclatured CX-4245/G, which, during engineering tests, has been laid by helicopter at speeds up to 100 mph! The new cable consists of a twisted pair of small coaxials, each jacketed with BAKELITE high-density polyethylene DGD-4100 to provide the exceptional toughness and protective qualities essential during cable laying and in actual use.

Ten miles of this cable will be boxed and carried in an aluminum frame and laid by helicopter in about six minutes. It can be strung with extreme accuracy, and even suspended in trees to cross rivers and roads.

This aerial installation calls for the superior abrasion resistance, shear strength, environmental and thermal stress cracking resistance found in BAKELITE high-density polyethylene DGD-4100. Along with these improved properties are the familiar polyethylene advantages of light weight, excellent insulating properties and ease of handling.

Get more information and samples of this material by writing Dept. BG-160, Union Carbide Plastics Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. *In Canada:* Union Carbide Canada Limited, Toronto 7.

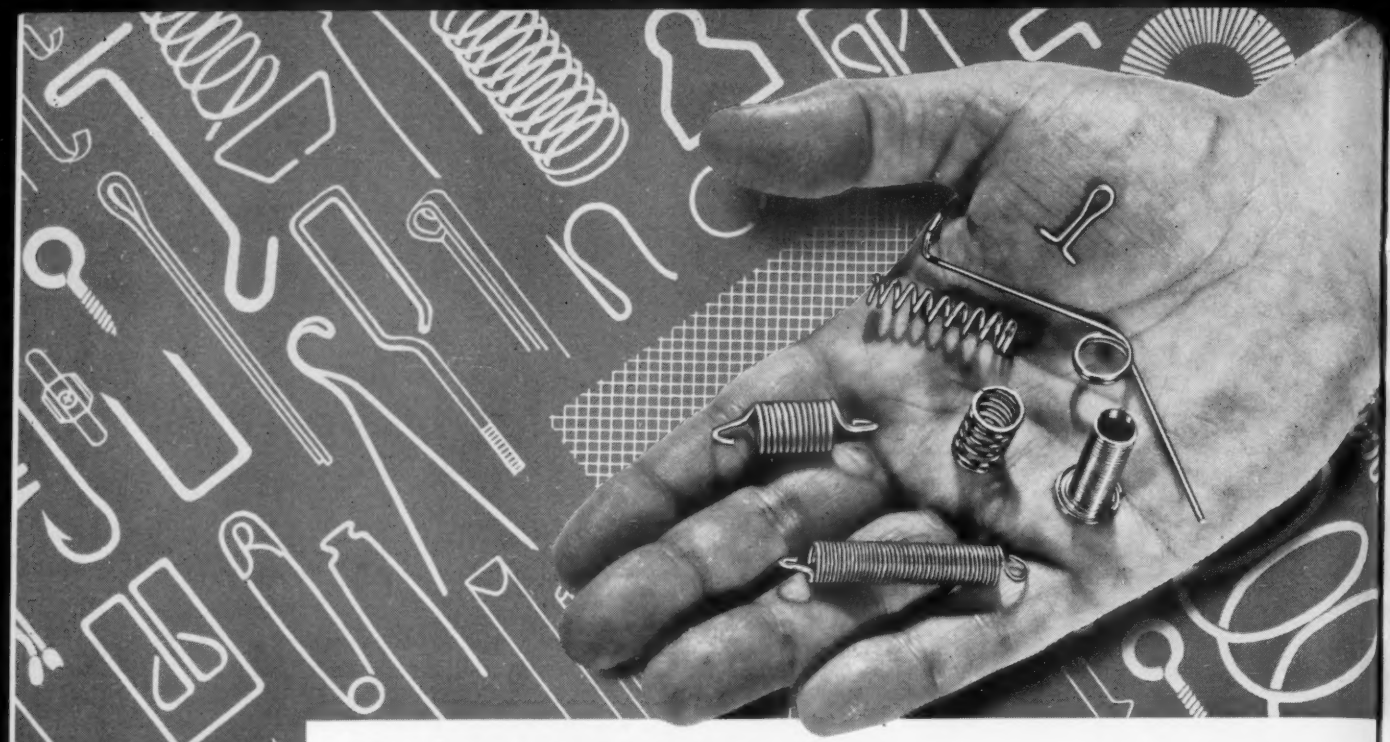
TYPICAL PROPERTIES "BAKELITE" DGD-4100 BLACK 9845

Properties	ASTM Test	Typical Value
Melt Index @ 44 psi (gms/10 min)	D 1238	0.2
Density	D 1505	0.957
Tensile Strength, psi	D 412	3400
Per Cent Elongation	D 412	250
Durometer Hardness, Shore Type "D"	D 676	58
Brittleness Temp., °C.	D 746	-95
Shear Strength, psi	D 732	3000
Stiffness in Torsion, @ 23°C., psi	D 1043	100,000
Tree Wire Abrasion Test	(1)	
50% Abraded (Cycles)		800,000 ca.
100% Abraded (Cycles)		1,500,000 ca.
Environmental Stress Cracking, F_{50}, hrs.	D 1693 (2)	500
Thermal Embrittlement Resistance, hrs. @ 70° C., F_0	(3)	5000
Deformation at 110 deg. C., per cent	(4)	0
Dielectric Constant	D 1531	2.65
Dissipation Factor	D 1531	.004
Dielectric Strength, Short Time, volts/mil	D 149	580

(1) IPCEA Tree Wire Test—S1981
(2) Samples previously aged 7 days @ 70° C.
(3) Standard U/L Heat Shock Test—1/32" insulation on #14 AWG solid copper conductor wrapped around its own diameter.
(4) UCPC Method WC 75 B/3—1/32" wall on #14 AWG wire. Test terminated at 5000 hrs.

UNION CARBIDE

"Bakelite" and "Union Carbide" are registered trade marks of Union Carbide Corporation.



PAGE SPECIAL HB
Can Cut Wire Costs Up to 60%

You can use PAGE *Special* HB for many jobs where music wire has always been specified—and save up to 60% on your wire costs! Tensile strengths of *Special* HB, which is available in the size range .020″ diameter to .162″ diameter (bright finish and galvanized), approach those of music wire in all sizes—and in sizes .090″ diameter and coarser equals them! Here are some typical examples:

SIZE	STANDARD HB	*SPECIAL* HB	MUSIC WIRE
.1620	219,000 min.	**249,000 min.**	249,000 min.
.1350	227,000 "	**258,000 "**	258,000 "
.0800	244,000 "	**276,000 "**	282,000 "
.0200	310,000 "	**320,000 "**	350,000 "

If you now use music wire, or have been prevented from using it because of its high cost, it makes sense to investigate PAGE *Special* HB.

WHATEVER your wire requirements, you can count on PAGE quality from America's leading special-purpose wire mill. PAGE will give you the tensile strength, ductility, finish, tolerance and other properties you require in a wide range of manufacturers wire items — including corrosion-resistant ACCO *Aluminized* Wire and wires of special shapes.

Write for details. Write us at Monessen, Pa., for Booklet **DH-107a** for the story on PAGE *Special* HB—or for information on other wires.

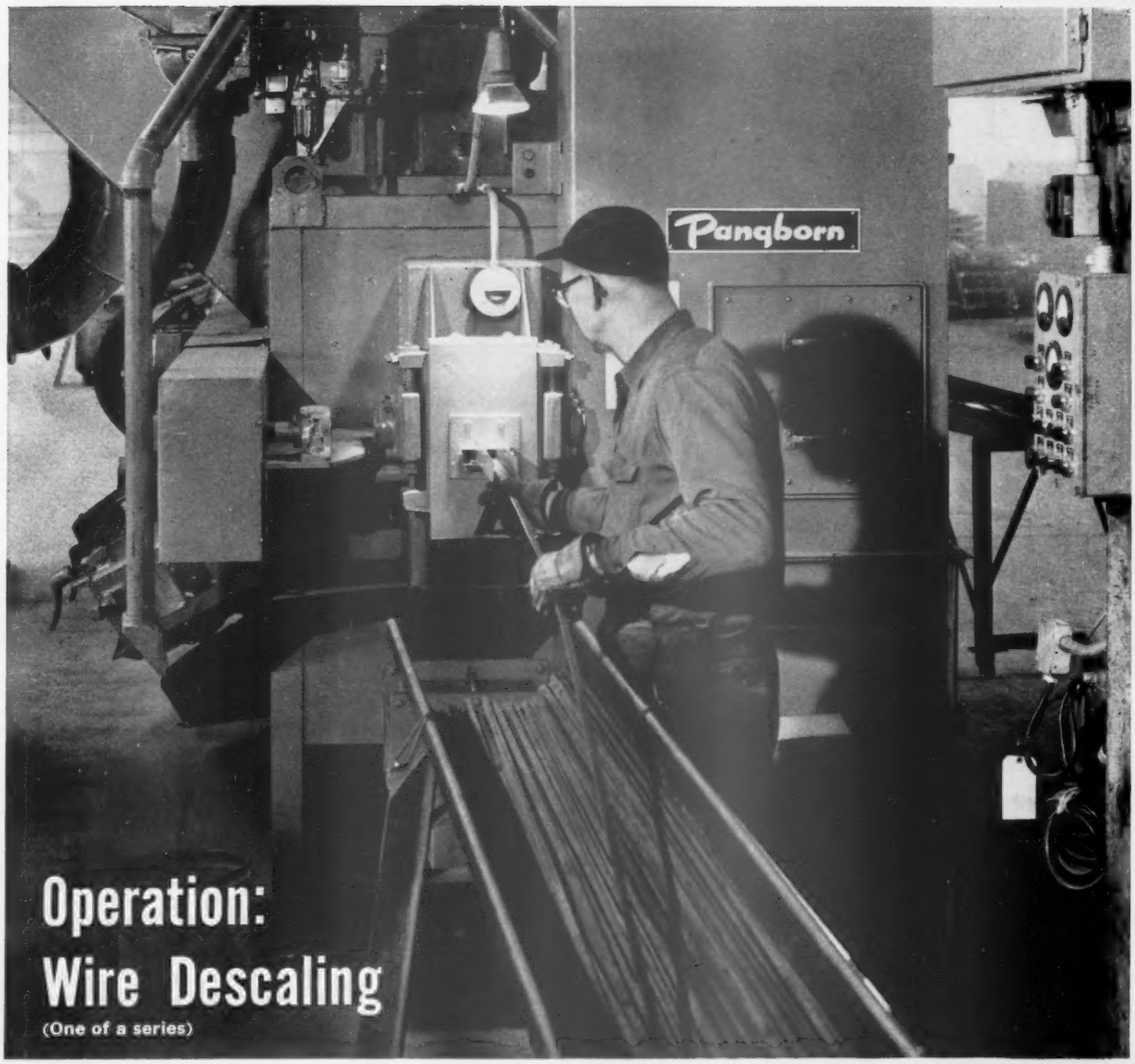
ACCO

PAGE MANUFACTURERS WIRE

Page Steel and Wire Division • American Chain & Cable Company, Inc.

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.

PAGE — *the source for answers to wire problems*



How to eliminate pickling, cut descaling costs

Answer: Rotoblast. For the Pangborn Rotoblast Descaling Machine gives fastener manufacturers and wire producers a truly cost-cutting, convenient method of descaling. It cleans quickly and thoroughly, with a minimum of manpower requirements.

This airless-blast unit can be installed in line with coating and drawing equipment to provide straight-through production; rod can be handled in either cut lengths or coils. Following a patenting furnace, the Pangborn Rotoblast Descaling Machine can descale multiple strands of wire up to 40 or more.

Discover how this unit can cut *your* wire or wire rod descaling costs. Talk to your Pangborn man or write PANGBORN CORPORATION, 5400 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning, Vibratory, Dust Control Equipment—Rotoblast® Steel Shot and Grit.©*

ROTOBLAST ADVANTAGES OVER PICKLING:

- Lower initial investment; cost savings ranging up to 70% over pickling
- Only ⅓ to ½ as much floor space
- Much faster performance
- Cleaner, safer operation . . . acid disposal problem eliminated
- Less manpower
- Various surface finishes
- High degree of automation

Pangborn
OF HAGERSTOWN

WHY MOCO WIRE PROCESSING EQUIPMENT IS YOUR FINEST LONG RANGE INVESTMENT

Magnet wire processing equipment as developed, designed and manufactured by Michigan Oven Company incorporates the same principles of controlled convection and recuperative catalytic incineration which we pioneered and developed for other heat processing applications.

After years of concentrated research and coordinated effort with magnet wire manufacturers, MOCO equipment has been accepted as the finest investment possible in long lasting wire production machinery.

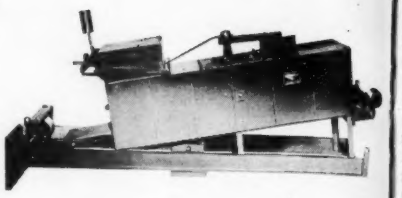
The techniques used are the very latest.

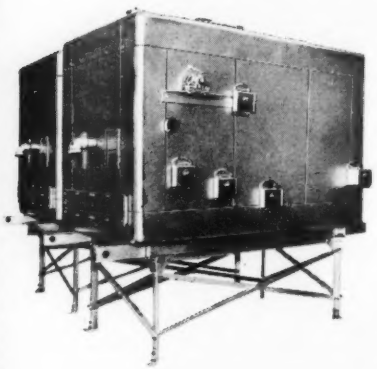
The equipment has been fully tested under the most exhaustive production runs. Michigan Oven Company is aware of all the problems and will cooperate in recommending the proper equipment for specific needs—and, of course, will render special engineering service for unusual applications.

The equipment shown is a partial view of MOCO's wire processing line. Your inquiry on all types of magnet wire processing equipment is welcomed and will be given immediate attention.

SELF GENERATING ATMOSPHERE ANNEALERS

This is the first gas-fired annealer using the heating equipment as an internal inert atmosphere generator. Advanced mixing and burning equipments are utilized which exclude the need for external sources of steam or costly inert atmospheres. Available in horizontal or vertical mounting positions.





HORIZONTAL WIRE ENAMELING OVENS

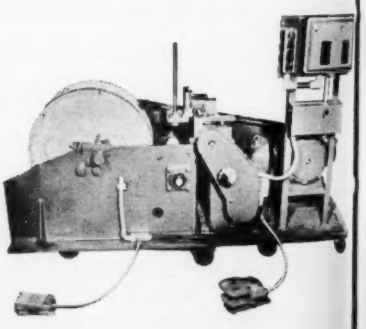
These horizontal fine wire enameling ovens for either gas or electric heating operate on MOCO's high velocity recirculating principle. They are equipped with internal catalysts insuring low fuel consumption, freedom from condensation and elimination of objectionable exhaust fumes. Accessories such as enamel applicators and sheaves are available.

UNIVERSAL REEL OR DRUM PACKER

MOCO was first to develop and install a universal wire packaging machine with combination takeup unit permitting packaging of wire on 6" or 12" diameter spools or in either 100 lb. capacity pails or 500 lb. capacity barrels. Packaging arrangements are optional from spindle to spindle without machine alteration.

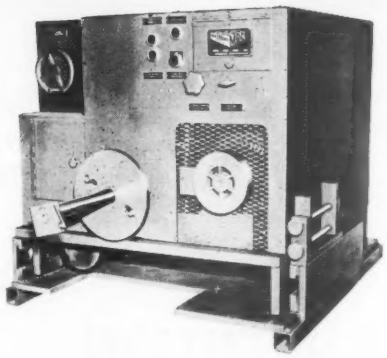
SPECIAL REELERS

High speed, heavy-duty wire traversing takeups for heavy round and rectangular conductors. Reel capacity up to 1000 lbs. and speeds up to 500 feet per minute. A variety of drives are available for tieing in to various types of equipment.



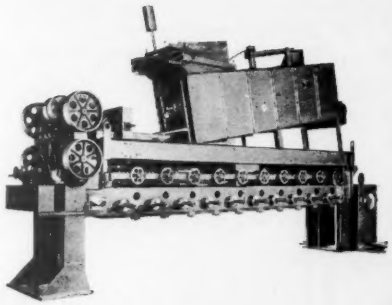
LEVEL WINDERS

Traversing reel type, layer wind takeups for heavy round and rectangular conductors. Infinitely variable traverse adjustments over a wide range of wire sizes. Reel capacity – 500 lb. maximum. Wire speed – up to 100 feet per minute.



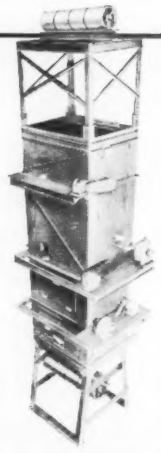
HEAVY ROUND AND RECTANGULAR TAKEUP

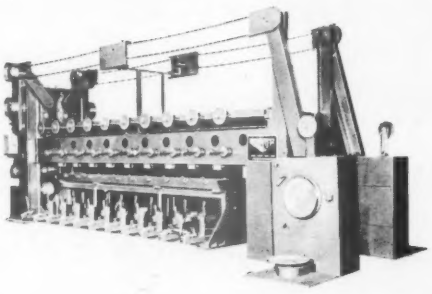
Four strand takeup unit for heavy round and rectangular conductors, with preannealing ovens mounted on top. These units are available up to 6 strands, with either dual capstan or fleeter ring assemblies.



VERTICAL WIRE ENAMELING OVENS

This vertical two-zone high velocity axial flow recirculating wire enameling oven has internal recuperative catalytic unit which eliminates condensate and recovers latent solvent energy. Five other models complete the range from the finest wire through large rectangles.



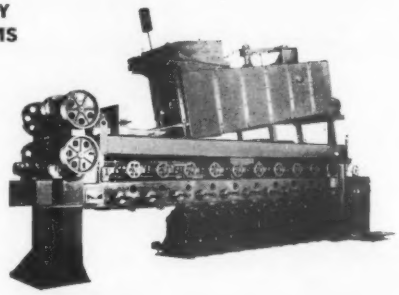


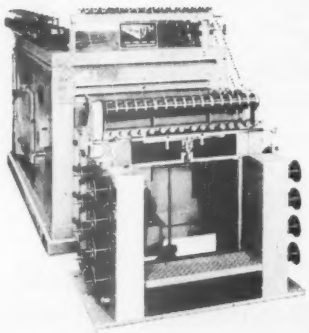
INTERMEDIATE SUPPLY AND TAKEUP MECHANISM

20 Line takeup and supply stands for wire sizes .0089 to .025, inclusive. These units are also available with any number of auxiliary barrel packing units. Designed for operation with the vertical wire enameling oven shown opposite. Custom engineering for special spooling requirements is available.

ENAMELED WIRE SUPPLY AND TAKEUP MECHANISMS

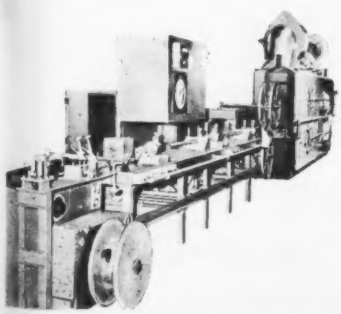
20 Line Heavy-duty spoolers for wires up to and including .072 diameter. These units may be equipped with any number of auxiliary barrel packing units and provide for mounting supply stands beneath and preannealing oven on top. Various arrangements are available for special purposes.





FINE WIRE ENAMELING MACHINE

Typical of the complete line is this type "B" machine which handles wire from 31 A.W.G. to 42 A.W.G. Five other models complete the range from the finest wire through large rectangles. The horizontal, high volumetric, recirculating double-pass oven allows greatly increased production by rapid heat impartation and a high degree of temperature uniformity.



TEXTILE INSULATING AND IMPREGNATING MACHINES

MOCO was first to develop and install rapid heat-cool tunnel type varnish impregnating ovens. This MOCO double insulating machine and layer wind takeup applies two servings of glass or yarn and four coats of baked insulating varnish simultaneously to heavy rounds and rectangulars. Quick starts and stops are accomplished without production loss.

MICHIGAN OVEN COMPANY

MOCO

WIRE EQUIPMENT DIVISION
425 Brainard Street
Detroit 1, Michigan

Please send me complete information on the many outstanding MOCO features:

- ☐ Wire Enameling Machines
- ☐ Glass Insulating Machines
- ☐ Other
- ☐ Self-generating atmosphere Annealers
- ☐ Reel-R-Drum Packers

NAME_____ TITLE_____

COMPANY_____ ADDRESS_____

CITY_____ ZONE_____ STATE_____

It is early, but NOW is the time to plan for

YOUR ATTENDANCE AT

THE ANNUAL CONVENTION

of

THE WIRE ASSOCIATION

THE DATES: November 14-17, 1960

THE CITY: Chicago, Illinois

THE PLACE: La Salle Hotel

Four full days of technical papers, good fellowship, plant visitations and other features that will make your Convention memorable.

Complete and separate, simultaneously held technical sessions will offer excellent presentations of papers for the following divisions:

FERROUS
NON-FERROUS
ELECTRIC WIRE & CABLE

Plant Tours of Western Electric Company's Hawthorne Works and Republic Steel Corporation's South Chicago Wire Mills have been arranged. Much that is new will be seen since our last visits some years ago.

All wire men are invited to attend
The 1960 Convention in Chicago.
Won't you arrange now to attend?
Full details will be published later.

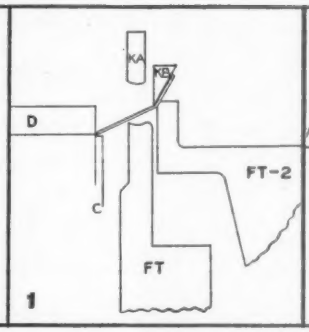
THE WIRE ASSOCIATION

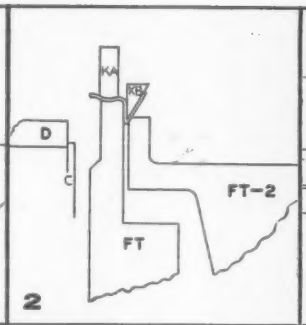
RICHARD E. BROWN, Executive Secretary

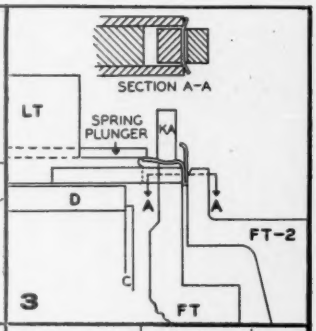
453 MAIN STREET STAMFORD, CONN.

KEY

KA King Post Tool
KB King Post Tool Inserted
FT Front Slide Tool
FT2 Front Slide Tool #2
RT Right Slide Tool
LT Left Slide Tool
BT Back Slide Tool
C Cut-Off
D Cut-Off Die

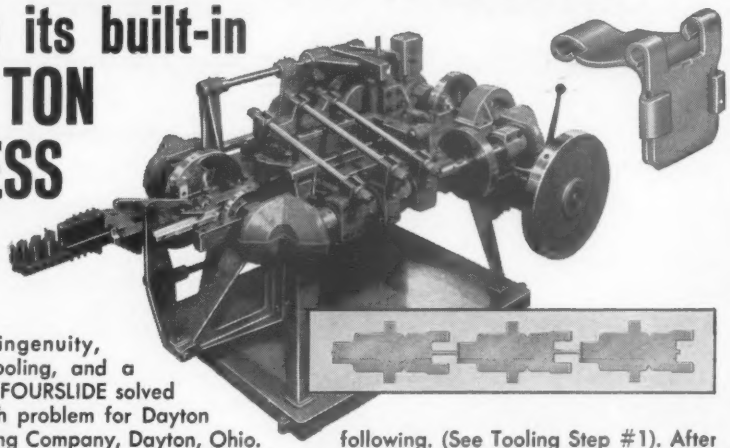






JOB SHOP MAKES COMPLEX PIECE IN ONE OPERATION

on a NILSON S-3-F FOURSLIDE with its built-in 20 TON PRESS



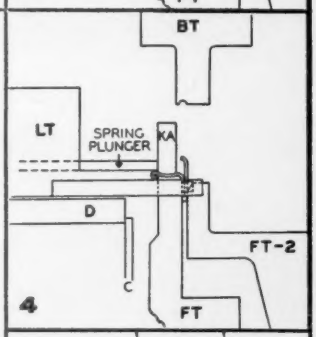
Design, ingenuity, simple tooling, and a NILSON FOURSLIDE solved this tough problem for Dayton Coil Spring Company, Dayton, Ohio. They put this job on a NILSON S-3-F for speed and economy of tooling, instead of in their stamping department.

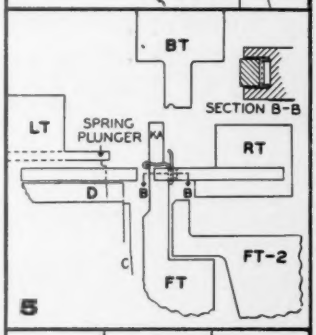
They benefited first by getting into production faster than possible with complicated cams and progressive dies necessary to do the same job. Second, even though the part is complex, the FOURSLIDE tooling is simple and comparatively inexpensive. Third, the entire piece is formed completely in one machine, resulting in equipment and manpower savings.

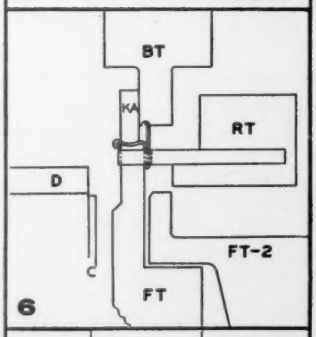
The built-in 20 Ton Press produces blanks, from .025" x 1.125" cold rolled ribbon steel, which are continuously fed into the FOURSLIDE tooling area, where the first blank is cut off from the one following. (See Tooling Step #1). After the 6 additional steps shown here, the piece is completed and ejected. SEVEN MODELS of NILSON ribbon metal forming FOURSLIDES are available with various speed ranges between 32 to 204 parts per minute, stock widths up to 3½ inches, and with built-in press sections ranging from 5 to 75 tons capacity.

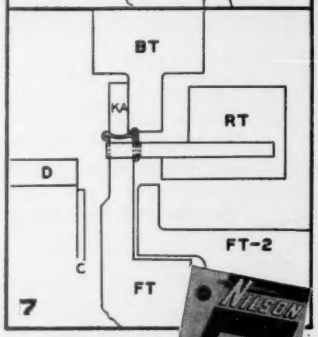
Many of these production savings can be yours when you consider *every* metal stamping and wire forming job as an opportunity to save time and dollars with a NILSON FOURSLIDE MACHINE.

Remember — it's usually simpler to tool a FOURSLIDE, it's certainly faster, the economy is startling, and you'll do stamping jobs in one operation that you didn't think could be done.









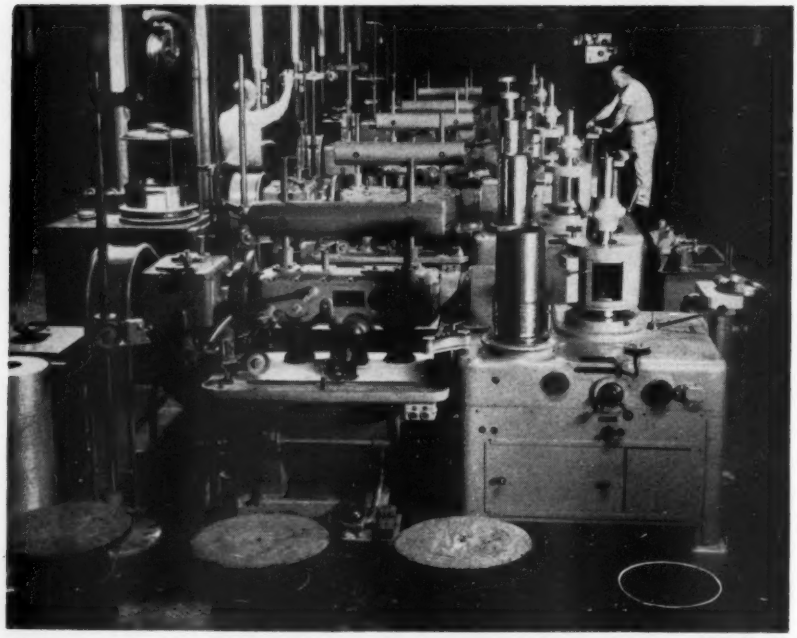
NILSON

A. H. NILSON MACHINE CO.

625 Bridgeport Avenue ● Shelton, Conn.

Write today for the NILSON FOURSLIDE Catalog No. 62.

BEFORE: Here, wire is being drawn "the old fashioned way."



AFTER: Shiny and new, with the look of tomorrow, the new wire drawing equipment at Prentiss produces wire better and faster.

NEW WIRE MACHINES UP PRENTISS OUTPUT

Five new wire drawing machines have been installed at Prentiss Wire Mills, Riverside-Alloy Metal Division, according to J. R. Fuller, manager of Prentiss. The new high-speed equipment has replaced ten rows of antiquated single hole tub drawing benches.

The new wire drawing machines are now in production and have drawn wire down to .008 inches diameter, only slightly thicker than a human hair, maintaining extremely close tolerances. They will be used to draw all types of wire including nonferrous alloys and high and low carbon steels.

After drawing, the machines automatically wind finished wire on spools or cores with capacities from 10 to 60 pounds, or in coils. Increased spool capacity pays off for customers by permitting longer uninterrupted production runs.

A number of new specialty wire products are now practical with the precision, high-speed equipment which constitutes the latest step in the continuous modernization of Prentiss Wire Mills.

"PRENTISS" adds "HERBORN" Wire Drawing Machines To Their Line

"HERBORN" TF IIIc Wire Drawing Machines photographed at the plant of Prentiss Wire Mills, Riverside Metal Alloy Division, H. K. Porter Company, Inc., at Holyoke, Massachuetts.

***Photos and text courtesy "Re:Porter," published monthly by H. K. Porter Company, Inc.**

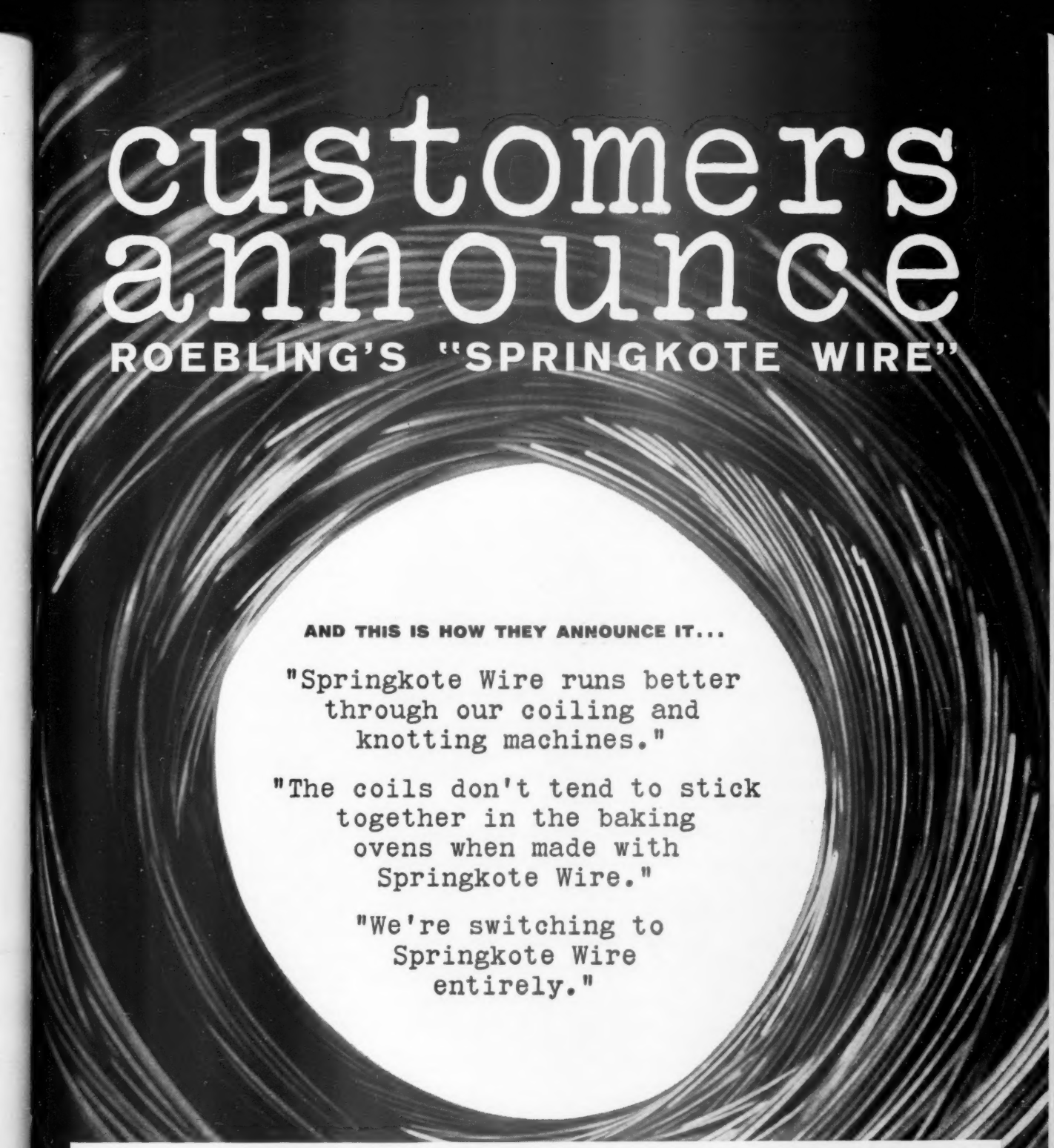
Please send your inquiries to:

MASCHINENFABRIK HERBORN BERKENHOFF & DREBES A.-G. **HERBORN/DILLKREIS**
GERMANY

HERBORN MACHINERY CORPORATION, 61 Hudson Street HACKENSACK, N. J.

customers announce

ROEBLING'S "SPRINGKOTE WIRE"



AND THIS IS HOW THEY ANNOUNCE IT...

"Springkote Wire runs better through our coiling and knotting machines."

"The coils don't tend to stick together in the baking ovens when made with Springkote Wire."

"We're switching to Springkote Wire entirely."

And this is *why* our upholstery spring wire customers are telling you about Springkote Wire instead of us. With the advent of the electrical resistance heating method, lime-coated wire posed some problems during stress-relieving operations, burning out electrical contacts and often causing uneven heat distribution in coils. As an effective answer to the problem, Roebling developed Springkote Spring Wire, upholstery grade. Trial lots of Springkote Wire were used by some of our customers, resulting in the enthusiastic word-for-word reactions above. Incidentally, the trial lots have been extended into production lots.

Roebling Springkote Wire paints better, bakes better and stress-relieves more evenly than whatever you're using now. (This last is *our* word-for-word reaction.)

We almost forgot to tell you that Roebling Springkote Wire costs no more than wire with the standard lime coat, which we will still supply to those who want it.

For more about Roebling Springkote Wire, write Wire and Cold Rolled Steel Products, John A. Roebling's Sons Division, Trenton 2, N. J.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

ADDENDA

The following persons have become members of THE WIRE ASSOCIATION since the list for the 1960 Buyers' Guide was compiled. This list is to May 15, 1960.

ARTURO PEREZ AYALA, PRODUCTION
Conductores Monterrey, S.A.
Ave. Churubusco Y Via A Tampico
Monterrey, Mexico

NICHOLAS BANDAS, PRODUCTION SUPERINTENDENT
William Brand-Rex Division
American Enka Corporation
Willimantic, Conn.

CHARLES T. BEALL, PRESIDENT
All West Wire Products Co.
971 Terminal Way
San Carlos, Calif.

JOHN W. BECKER, VICE-PRESIDENT-MANAGER
National-Standard Co. of Canada Ltd.
133 Woolwich Street (P.O. Box 266)
Guelph, Ontario, Canada

J. E. BELLAMY, INDUSTRIAL SALES
Balfour Guthrie & Co., Ltd.
530 West 6 Street
Los Angeles 14, Calif.

ANDREW BODNAR, JR., DIVISIONAL STAFF ENG.-WIRE MILLS
John A. Roebling's Sons Division
The Colorado Fuel & Iron Corporation
640 S. Broad Street
Trenton 2, N. J.

LEON BOTS, ENGINEER-DIRECTOR
S. A. Cockerill-Ougree-Division Trefilerie
30, Nijverheidstraat
Hemiksem-lez-Anvers, Belgium

ROBERT R. BRENAN, SENIOR ENGINEER
Sylvania Electric Products Inc.
825 Lexington Avenue
Warren, Pa.

DONALD S. CROPPER, SALESMAN
Balfour, Guthrie & Co., Ltd.
530 W. 6th Street
Los Angeles 14, Calif.

ROGER CRUYSMANS, ENGINEER AT DRAWING SHOP
S. A. Cockerill-Ougree-Division Trefilerie
30 Nijverheidstraat
Hemiksem-lez-Anvers, Belgium

VINCENT J. DOBOS, WIRE MILL SUPT.
American Chain & Cable Co. Inc.
Page Steel & Wire Division
1st & River Streets
Monessen, Pa.

WILLIAM L. EDWARDS, DEPARTMENT SUPT. WIRE PRODUCTS
American Steel & Wire Division
United States Steel Corporation
4300 E. 49th Street
Cleveland 25, Ohio

JOHN A. FAHEY
Wire and Wire Products
453 Main Street
Stamford, Conn.

A. E. FRANKS, PRESIDENT AND GENERAL MGR.
Armeteo, Inc.
776 West Kemrow Avenue
Wooster, Ohio

DAVID J. GARRISON, RESIDENT MANAGER
Enfield Cables Ltd.
50 Broad Street
New York 4, N. Y.

HUMBERTO J. GARZA, PRODUCTION
Conductores Monterrey, S. A.
Ave. Churubusco Y Via A Tampico
Monterrey, Mexico

BRUCE W. GONSER, TECHNICAL DIRECTOR
Battelle Memorial Institute
505 King Avenue
Columbus 1, Ohio

D. A. HAARBAUER, GENERAL SUPERINTENDENT
Tennessee Coal and Iron Division
United States Steel Corporation
P.O. Box 599
Fairfield, Alabama

JOHN F. HANDLER, MGR. MATERIALS CONTROL
Bulova Watch Company Inc.
Bulova Park
Flushing 70, L. I., New York

NEWMAN M. HORTON, EXECUTIVE V. P. & GEN. MGR.
Precision Twisted Kraft Products Inc.
Deep River, Conn.

C. M. HUSBAND, EXECUTIVE VICE-PRESIDENT
Matthew Wylie (Canada) Ltd.
17 Regent Road
Downsview, Ontario, Canada

GERARD JANSSEN, ENGINEER AT WIRE PRODUCTS-SHOP
S. A. Cockerill-Ougree-Division
Sambre-Escaut
Scheldeboord
Hemiksem-lez-Anvers, Belgium

JOHN T. JENNINGS, PROPRIETOR
Eastern Engineering Co.
472 Westfield Avenue East
Roselle Park, N. J.

ERNEST L. JENSON, ENGINEER
New Haven Wire & Cable, Inc.
P.O. Box 183
New Haven, Indiana

ROBERT A. JONES, JR., SALES MANAGER
Carlton Manufacturing Co.
593 Mineral Spring Ave.
Pawtucket, R. I.

D. M. KARIWALA, PARTNER
Rajasthan Cable Industries
23/25 Motishah Chawl
Sheikhmemon Street
Bombay 2, India

GEORGE S. KENNINGS, PRODUCTION ENGINEER
United States Army Signal Supply Agency
Philadelphia 3, Pa.

WALTER W. KESTELOOT, VICE-PRESIDENT & WKS. MGR.
Whitney Blake Company
New Haven, Conn.

RAYMOND R. KING, VICE-PRESIDENT
John W. Gottschalk Mfg. Co.
3650 N. 10th Street
Philadelphia 40, Pa.

HARRY R. LANGE, ENGINEER
Metaflo Research Div. of
Textron Inc.
2683 Halladay Street
Santa Ana, Calif.

JAMES T. LARKIN, FOREMAN, SPOOLING DEPT.
Driver-Harris Company
Middlesex Street
Harrison, N. J.

CHARLES E. LESCHINE, PRODUCT ENGINEER
H. K. Porter Co. Inc.
National Electric Division
14th & Duss Avenue
Ambridge, Pa.

ANDRE LINE, DIRECTEUR GENERAL
Ets. Victor Line S.A.R.L.
54, Rue Hoche a Albert
(Somme) France

J. H. LORENZ, REGION PRODUCT MANAGER
Union Carbide Corp.
Silicones Division
100 East 42 Street
New York 17, N. Y.

WILLIAM C. LOVELETT, DIVISIONAL PLANT ENGINEER WIRE MILLS
John A. Roebling's Sons Division
The Colorado Fuel & Iron Corporation
640 South Broad Street
Trenton 2, New Jersey

JOHN T. McHUGH, DIV. SUPT.-WIRE & WIRE PRODUCTS
American Steel & Wire Division
United States Steel Corporation
Donora, Pa.

JOHN E. MACKEY, FACTORY MANAGER
C. Tennant Sons & Co., of New York
Phoenix Road
Warren, Ohio

A. W. MONTAGUE, PURCHASING AGENT
Kaiser Aluminum & Chemical Corp.
P.O. Box 671
Newark, Ohio

JOHN E. MYERS, SALES MGR.-SPECIAL CABLE SALES
Royal Electric Corporation
95 Grand Avenue
Pawtucket, R. I.

HENRI NIEBERDING, ENGINEER AT DRAWING-SHOP
S. A. Cockerill-Ougree-Division
Sambre-Escaut
Scheldeboord
Hemiksem-lez-Anvers, Belgium

DONALD M. PERRY, PLANT ENGINEER
Custom Systems Corporation
P.O. Box 1899
Santa Ana, California

LEO J. RAGAN, ENGINEER
Townsend Company
Cherry Rivet Division
1224 E. Delhi Road
Santa Ana, California

ALFRED S. RAPP, MANAGER, WIRE DIV.
Johnson Machinery Co.
683 Freilinghuysen Avenue
Newark, N. J.

WILLIAM JOHN REED, PRODUCT MANAGER
Riverside Alloy Metal Division
H. K. Porter Company
Riverside, New Jersey

WILLIAM E. SAALE, METALS TRADER
Woodward & Dickerson Inc.
60 East 42 Street
New York City

WILLIAM SHULVER, PROJECT ENGINEER, ELECTRICAL PRODUCTS DEVELOPMENT LAB.
Owens-Corning Fiberglas Corp.
Ashton, R. I.

PAUL SINANIS, SALES REPRESENTATIVE
The Coulter & McKenzie Machine Co.
35 Union Avenue
Bridgeport 7, Conn.

S. B. SMITH, PRESIDENT
S. B. Smith Machine & Tool Co.
193-16 99 Avenue
Hollis 23, New York

GEORGE A. SNOW, CHIEF METALLURGIST
Simplex Wire & Cable Co.
79 Sidney Street
Cambridge, Mass.

GODFREY J. STIER, WIRE MILL MANAGER
Leschen Wire Rope Div.
H. K. Porter Co. Inc.
2727 Hamilton Avenue
St. Louis 12, Mo.

KEITH STILL, MANAGER
Rylands Brothers (Aust.) Pty. Ltd.
Box 245 P.O.
Newcastle, 2N., Australia

GEORGE V. TAYLOR, VICE-PRESIDENT MANUFACTURING
Standard Wire and Cable Limited
70 Wingold Avenue
Toronto 19, Ontario, Canada

A. H. THOMAS, APPLICATION ENGINEER (SALES)
General Electric Company
Industrial Heating Department
1 Progress Road
Shelbyville, Indiana

MICHEL RENE THOMAS, PRINCIPAL ENGINEER
Forges & Acieries de Commercy
Commercy Meuse, France

MARCEL VAN BEVER, ENGINEER AT DIVISION N. S.
S. A. Cockerill-Ougree-Division Trefilerie
30 Nijverheidstraat
Hemiksem-lez-Anvers, Belgium

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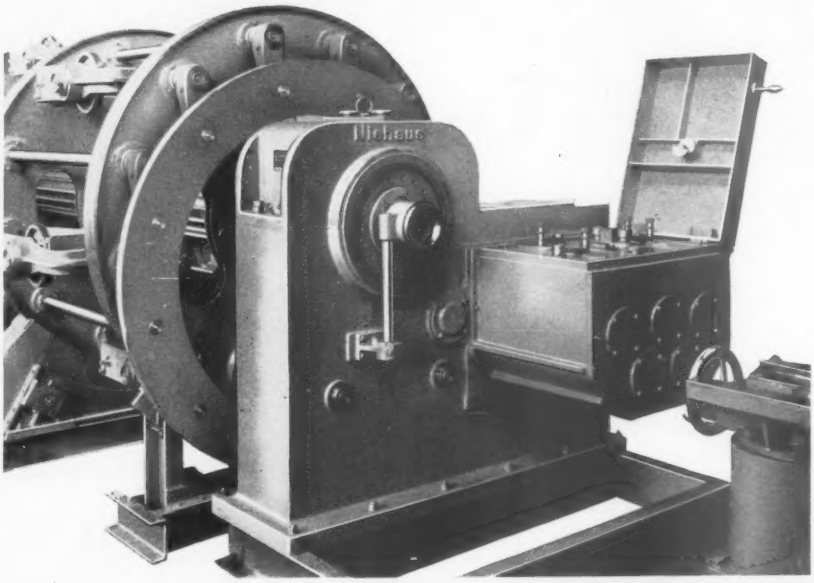

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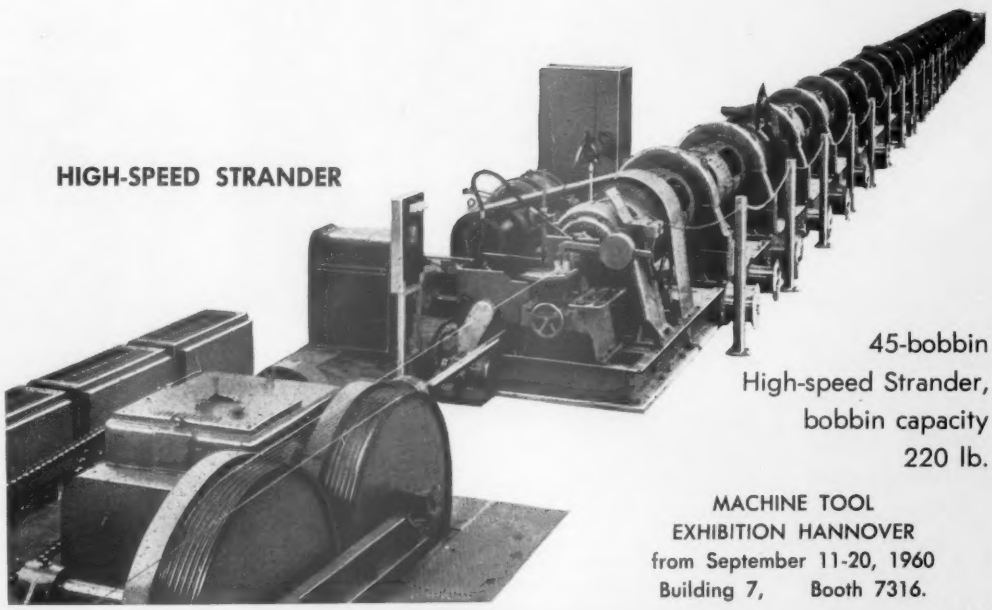

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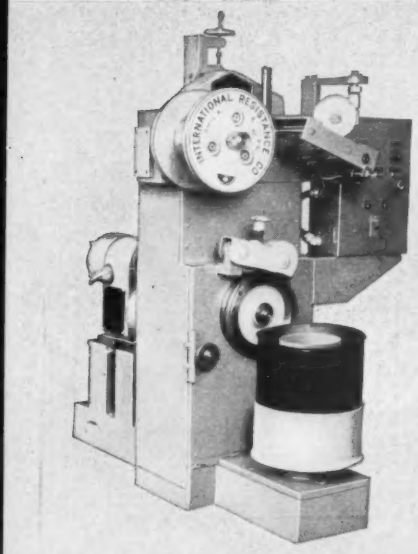

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MODEL C-100 TAKE-UP

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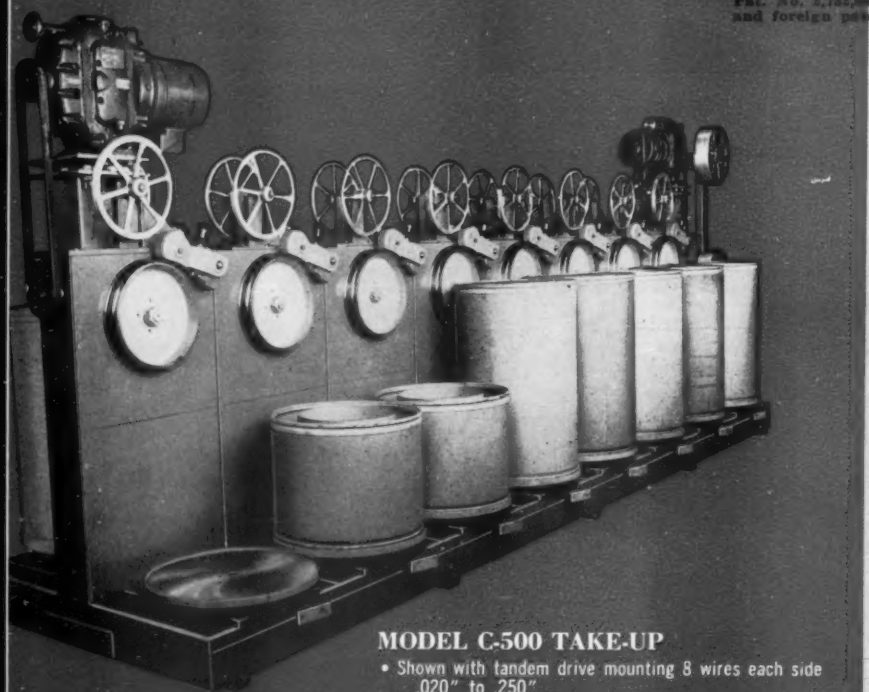

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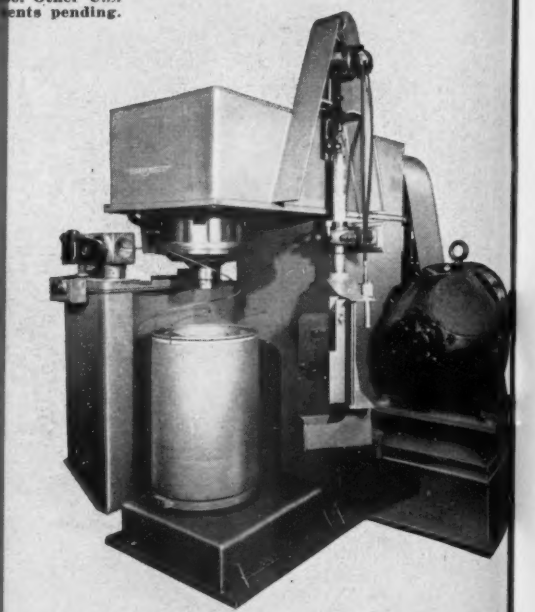

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JUNE

The Wire Outlook

Business activity is considered satisfactory, even though not all that might be hoped. A good deal of the quietness appears to stem from our old friend — inventories.

Last year inventories were too large and business was slack while they were being worked off. Then came a period of anticipated increasing activity and a prospect of higher prices, so everyone jumped into the market to rebuild stocks. Now they are high again and buying is a bit slow as a result. In the first quarter stocks for inventory rose an average of about a billion a month, according to the Commerce Department. For the steel industry, because supplies are plentiful, much buying is on a hand-to-mouth basis.

However, two major industries are showing encouraging signs of life — automotive sales have taken a spurt and the building index is on the rise, even though private housing starts are off. Consumer spending is running high, 10 percent higher in March than in February, with credit buying totaling over 4 billion in March.

The stock market, after a long period of declining prices, has taken a turn upward in the last few days, although too much importance should not be attached to market fluctuations, considering how greatly overpriced most equity securities have been in the light of earnings. The trend well may continue downward until toward the end of the year.

Brass wire mills report business generally lower than at this time last year. There has been a steady decline in the last few years in the use of copper-base alloy screws, screw machine products and hardware products. Brass plated steel has made inroads into the brass field, since it is cheaper than brass. Some of the brass mills' problems also stem from the steady influx of imported wire.

Electric wire and cable business has been fair except in the area of building wire for residential and commercial construction, one concern reporting that sales are down 20 percent. Since competition is keen among building wire manufacturers, profits have been on the short side. If construction continues its advance, matters may improve. Power cable and underground utility cable sales, as well as specialty electric wire for missiles, etc., are better than last year.

In the steel wire field, business is so-so. Merchant wire product sales are not as good as they should be, and did not rise to normal levels after the stormy Midwest weather had abated. Welded wire fabric for road building has responded to the better weather. Manufacturers' wire sales were hurt by the automobile cut-backs, but may show an improvement if the sales spurt continues. While merchant wire and wire products has been affected by imports, manufacturers' wire is relatively untouched by foreign rods and wire. One phase of industry that should be good in 1960 is the appliance industry. It consumes a lot of wire, both mechanical and electrical.

In general, it may be said that business is firm. In the first quarter, it operated at a rate of 498 billion dollars, with an actual total for the year expected to be in excess of this.

The sixties present us with an enormous potential and while production capacities are now in excess of needs, before the passage of this decade, they again will be inadequate.

Edmund D. Sickels

EDITOR

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DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 35 JUNE, 1960 No. 6

A New Wire Temperature Meter

by G. McH. Sturgeon, Grad. I., Mech. E.
Sheffield Laboratories
The British Iron & Steel Research Association
Sheffield, England

The capacity of modern wire drawing equipment for higher speeds can be utilized where temperatures induced by drawing can be measured and steps are taken to assure that suitable lubricants capable of withstanding the higher temperatures are used. This article describes a means of determining the conditions of drawing that will make possible precautions to meet them satisfactorily.

Introduction

If full advantage is to be taken of the high wire drawing speeds that present engineering and electrical machine design now made possible, the wire temperature during drawing must not be allowed to exceed that which allows good lubrication and satisfactory wire properties. For this an accurate quick acting wire temperature measuring device is required, and the need for such an instrument will become even greater in the future as instrumentation and process control are increasingly introduced into the wire industry. Such processes as the heat treatment of wire, in-line cleaning and coating are typical every-day operations where a temperature meter will be essential.

* * *

No wholly suitable instrument has been available in the past, but a meter recently marketed through the collaboration of BISRA and an instrument manufacturer*, has proved itself in the laboratory and in industrial wire mills during extensive experimental studies.

* * *

This paper summarises earlier developments and reports work carried out by BISRA and Addison in the production and calibration of this temperature meter for ferrous wire.

*Addison Electric Company Limited, 11/12 Bosworth Road, London, W.10, are the manufacturers of the meter described in this paper.

History of Development

The rise in wire temperature during drawing is caused by the heat generated during deformation and by friction in the die. Steep temperature gradients result in both the wire and the die, and the temperature distributions can be calculated by analogue techniques[1] if the surface temperatures are known. Wistreich[2] has reviewed several methods that have been used in the past to measure the die-wire interface temperatures. There are two simple methods of measurement: the first is to use the wire and the die pellet as a thermocouple, and second is to split the die pellet in two and use dissimilar metals forming a thermocouple for the two halves. Dies of this type have been developed, but for research purposes rather than for industrial use. Fortunately Eichinger and Lueg[3] have shown that the temperature differences across the wire disappear shortly after leaving the die, and it is probable that the short time these non-uniform temperatures exist is not sufficient to have any effect on the final wire properties. Hence for industrial purposes it is not necessary to know the die-wire interface temperatures and it is sufficient to measure the bulk temperatures of the wire. Work is in progress at BISRA to establish the validity of this last statement.

* * *

Bulk temperature can be measured by two methods, both depending on thermo-electric effects. Either the temperature can be measured directly by a contact device or alternately the warm wire can be used to heat a remote element by radiation and convection. Both methods have their limitations. The non-contact meter reading will depend on the size of the wire and its emissivity, and in addition the wire speed will affect the convection currents. Contact instruments may be subject to frictional heating and suffer from the necessarily larger thermal capacity of the measuring heads.

* * *

One of the first non-contact wire temperature meters[4] developed in BISRA is shown in Fig. 1. The

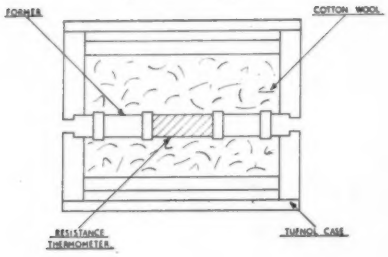

FIG. 1. EARLY BISRA WIRE TEMPERATURE METER

wire passed through a lagged tube containing a resistance thermometer. One of the main drawbacks to the use of this type of instrument is the danger of damage to the temperature measuring element during threading up or as a result wire breakage during drawing. Other non-contact instruments have been described by various authors. A particularly interesting meter was used by Godfrey and Lewis[5] and is shown in Fig. 2. The wire passes through a cylinder that is heated externally until there is no temperature gradient across the cylinder. Under these conditions the cylinder is in thermal equilibrium with the wire, and the cylinder temperature is the same as that of the wire. Instruments based on this principle have a slow response time but they nevertheless have proved to be very useful for research purposes.

* * *

Another principle investigated by BISRA was that of using a silver disc held in a Tufnol rod with a very fine wire thermocouple attached to the disc back. This temperature sensitive unit was maintained at a fixed distance from the wire by tungsten carbide V-grooves. This meter, shown in Fig. 3, was used successfully to measure temperature differences on and off capstans in the BISRA laboratories, but it proved to be extremely difficult to calibrate. The latest trend in the development of non-contact instruments is to use heat sensitive radiation cells, the measuring element being coated with indium antimonide or similar materials. This type of instrument

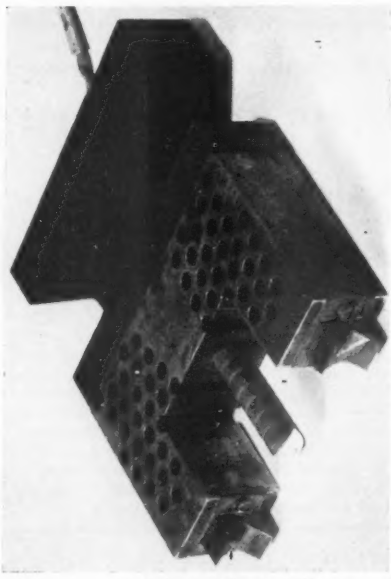

Figure 3 — BISRA Non-Contact Meter. *

is generally much more expensive than the prototype meter described later in this paper, but it still has a wide field of use measuring the temperature of delicate materials where a contact method may cause damage. For instance, it has been reported that this type of meter has been used successfully to measure the temperatures of fine nylon thread at above 150° C. The sensitivity of these cells decreases sharply as the temperatures to be measured approaches the ambient. This can be overcome by super cooling the heat sensitive cell with liquid oxygen or similar materials. This is quite simple to do under laboratory conditions but is obviously to be avoided if possible in a wire mill.

* * *

Early work at BISRA on non-contact meters showed that they were particularly sensitive to wire size and speed. The ambient temperature of the air or any other cooling medium in close proximity to the meter also affected the calibration. In view of these difficulties and the fact that it takes from 3-5 minutes to obtain a steady reading with such meters, development was stopped as being impractical for industrial use.

The Wire Temperature Meter

During the period that BISRA was developing and attempting to calibrate the non-contact wire temperature shown in Fig. 3, Addison developed a contact type meter that works on the principle of the wire completing a thermocouple circuit between pulleys of dissimilar metals. The first prototype instrument loaned to BISRA by the manufacturers for calibration tests is shown in Fig. 4 after being modified to BISRA specifications.

Figure 4 — Wire Temperature Meter Removed from its case. * * * * *

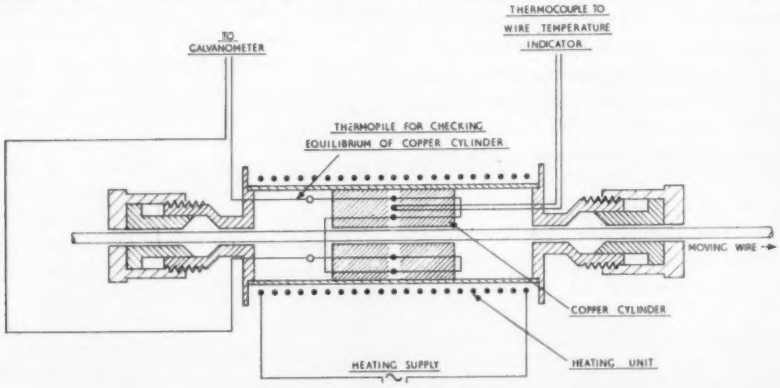

FIG. 2. TEMPERATURE METER USED BY D. Lewis. & H.J.Godfrey.

This meter has been specifically designed for the rapid temperature measurement of moving wire, the response time being 5-10 seconds for a normal reading. The measuring unit is self-contained in a case aproximately 10½ in. x 10½ in. x 4½ in. and weighs just over 5 lbs. To obtain a reading the pulley head assembly is pressed firmly on the moving wire (as shown in Fig. 4), the wire completing a circuit between the two pulleys in the measuring head that are made from dissimilar metals forming a thermocouple. The signal thus generated is passed to the instrument via special brushes mounted in the head, and then fed across a temperature sensitive Wheatstone bridge which is powered by a battery controlled to a constant voltage by a variable resistance. The out-of-balance current from this bridge is then passed to the calibrated meter.

Calibration of The Instrument

One of the main problems with the development of any wire temperature meter is that of relating the signal from the temperature meter to the wire temperature, i.e. its calibration. The most satisfactory method evolved to date is to produce an adequate supply of wire at a known temperature by heating a spool of wire in a closed-cycle, air recirculating oven (see Fig. 5) with six thermocouples placed at various depths in the spool of wire to ensure that it is all at the same temperature. The wire is then pulled out of the oven through a small tube in the side wall of the oven on to a conventional wire drawing machine. By this method, it is possible to guarantee the wire temperature to at least ± 2% at 200°C. Except at extremely low speeds of a few feet per minute, this method has proved most successful and the equipment has been designed to operate at speeds up to 3,000 ft/min.

* * *

Using this technique the Addison meter has been calibrated over a speed range of 50-3,000 ft/min., temperature range 50-300°C and wire sizes 9-16 SWG. The calibration for this prototype meter is shown in Fig. 6. The meter reading is independent of wire size and speed over the range tested, and accuracy is with ± 5°C which is considered to be sufficient to meet the needs of the industry. The calibration is not affected by the type of phosphate coating normally used for the drawing of high carbon steel wire. From theoretical considerations the calibration should not be affected by tin or zinc coatings either, provided there is no temperature difference in the wire between the contact points on the pulleys. As no effect was detected due to wire size during the calibration of the meter it is felt that it can be used with caution over a wider range of wire sizes than that with which it has been calibrated.

* * *

During tests with this meter on heavily soaped wire it was noticed that soap build-up on the pulleys made it difficult at times to obtain more than one reading without cleaning the contact surfaces of the pulleys. This difficulty has been overcome by fitting paraffin impregnated pads that are spring loaded on to the pulleys, thus ensuring that a clean surface is presented to the wire.

* * *

The calibration graph in Fig. 6 is only correct for the particular measuring head design supplied with the prototype instrument and any change in the thermal capacity of the pulleys would affect the readings. The instrument supplied for industrial use would have a correctly calibrated scale and hence it would not be necessary to interpolate from a calibration curve.

Assessment of The Instrument

The Addison meter is of robust construction and is supplied with a leather ever-ready carrying case as an optional extra.

* * *

It is simple and easy to prepare the instrument for operation. The bridge voltage must be adjusted to the correct value and compensation made for ambient room temperature, the whole preparation taking less than half-a-minute. The only other precaution needed is to ensure that the pulleys are clean and that the cleaning pads have been impregnated with paraffin. Care must be taken, however, to see that the pressure of the pads on the pulleys is not too great or skidding will occur and an incorrect reading will result due to frictional heating of the pulleys. This is most important when measuring temperatures of wires running at over 1,000 ft/min.

* * *

The instrument has proved itself in the laboratory and in industrial wire mills during extensive experimental studies of the cooling of high carbon steel wire during drawing. The present meter employs pulleys made of alloys

(*Please turn to page* 787)

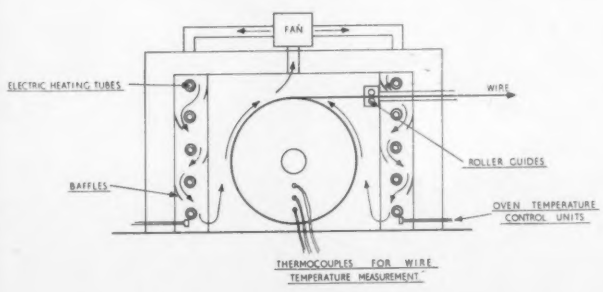

FIG 5 CLOSED CYCLE AIR RECIRCULATING OVEN

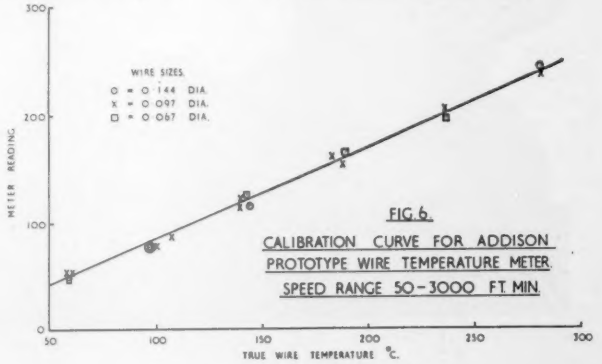

FIG 6
CALIBRATION CURVE FOR ADDISON PROTOTYPE WIRE TEMPERATURE METER SPEED RANGE 50-3000 FT MIN.

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Flange	Traverse	Barrel	Arbor	Flange	Traverse	Barrel	Arbor
2½"	3" 3¼"	1¾"	.628"-.633"	6½"	3" 3¼" 3½"	3½"	.635"
3"	3" 3¼" 3½"	1¾" or 2"	.625"-.633"	6½"	3" 3¼" 3½"	3½"	3"
4½"	3" 3¼" 3½"	2½"	.635"	6½"	6"	3½"	.635"
6"	3" 3¼" 3½"	3½"	.635"	6½"	6"	3½"	3"
6"	3" 3¼" 3½"	3½"	3"	7"	3" 3¼" 3½"	3½"	.750"
6"	6"	3" or 3½"	.635"	7"	6"	3½"	.750"
6"	6"	3½"	3"	8"	3½" 6" 6¼"	4" or 4½"	3" or 3 33/64"

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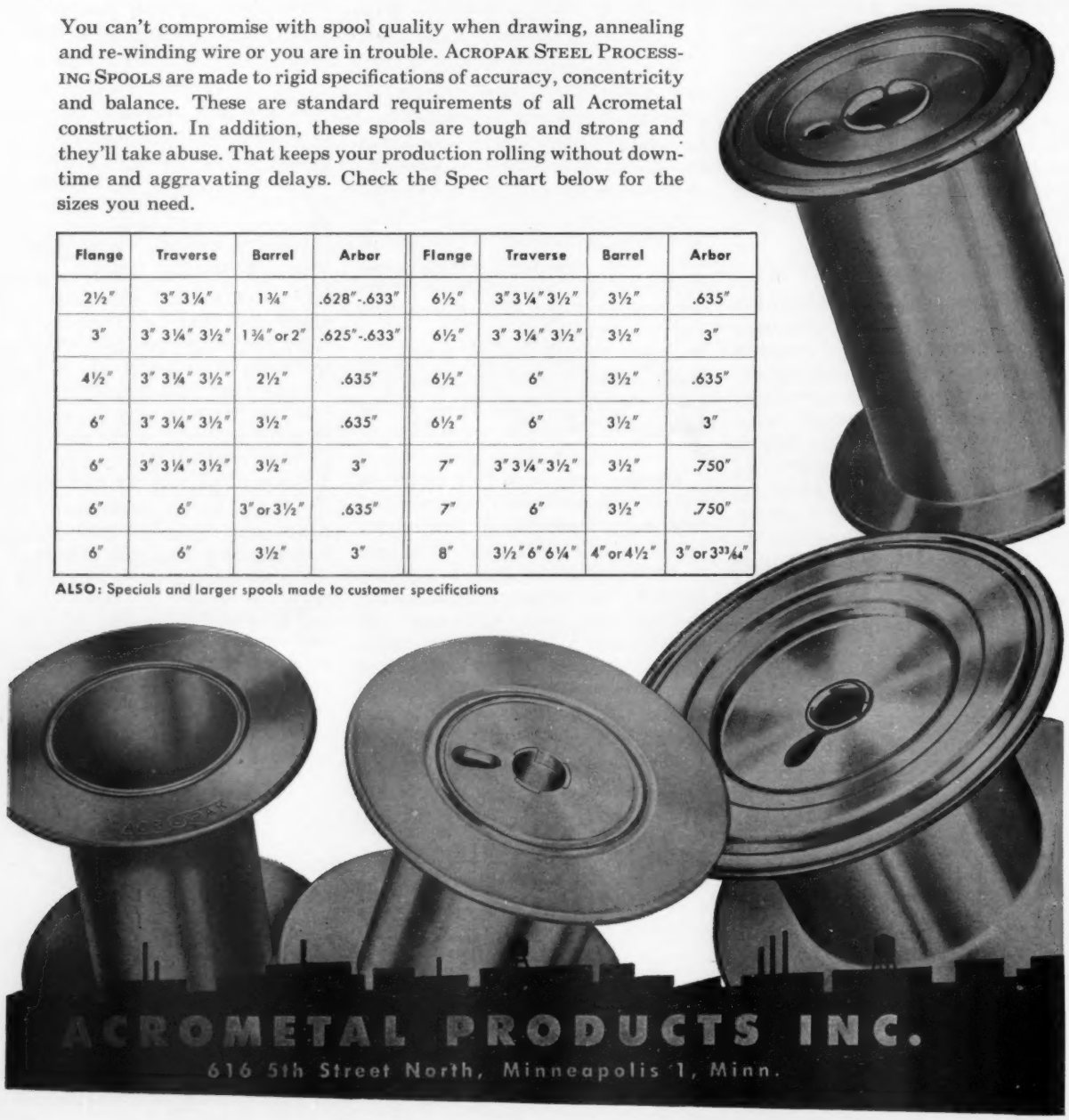

ACROMETAL PRODUCTS INC.

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The Design of Dies for High-Speed Wire Coating

by L. R. Hammond
Tenite Development Department
Tennessee Eastman Company
Division of Eastman Kodak Company
Kingsport, Tennessee

This paper was presented at the Eighth Annual Wire and Cable Symposium sponsored by the U. S. Army Signal Research and Development Laboratory on December 2, 1959, at Asbury Park, N. J.

Introduction

The coating of small gauge conductors at high rates of wire travel in many instances produces irregular surfaces. Such irregular surfaces occur in varying degrees and can be so severe as to render the coated wire unsatisfactory. Considerable work has been done on flow studies of polyethylene, but little work has been done on the practical approach to designing dies for high speed wire coating.

* * *

In this presentation some of the more obvious causes and the elimination of roughness will be discussed briefly, and the effect of various angles in the flow channel and the effect of land length on surface roughness will be discussed in detail.

* * *

In the work to be described, a 2½-inch NRM oil-heated extruder with a Davis-Standard pay-off unit, crosshead, capstan, and take-up assembly was used to coat 22 gauge, soft-drawn copper wire. Low-density polyethylenes with melt indices of 1.7 and lower were used in this study.

* * *

In order to better understand the varying degrees of surface roughness, the arbitrary, four-step classification illustrated in Figs. 1 through 4 was chosen.

* * *

The classification is as follows:

Smooth (Fig. 1). The surface is free from all irregularities and the coated wire has a uniform diameter.

* * *

Slightly Rough (Fig. 2). The surface has a frosted finish and/or is slightly irregular. The coated wire has a generally uniform diameter.

* * *

Rough (Fig. 3). The surface is broken with a considerable number of irregularities. The diameter of the coated wire is no longer uniform.

* * *

Very Rough (Fig. 4). The surface is broken with extreme irregularities resembling ocean swells. The diameter is not uniform.

Causes and Elimination of Roughness

Among the several causes of roughness are volatile materials in the formulation, gel particles in the polymer, an insufficient quantity of material in the die, a melt temperature that is too low, and melt fracture. Die geometry also plays an important role in roughness, but this subject will be discussed in detail later.

Volatile Materials

It is well known that volatile materials — for example, excess moisture — may create voids, or crater-like depressions. The voids are the result of the bursting of surface bubbles and the release of trapped moisture.

* * *

In some of our tests, the voids were found to be not continuous, but rather intermittently spaced between lengths of smoothly coated wire. In instances of very high moisture content in the formulations, the moisture could be heard escaping from the die with a popping sound during extrusion. The lower content of moisture (0.07%) resulted in a continuous, slightly rough coating without any voids. Our results show that, for satisfactory results, the moisture content of a formulation should be 0.03-0.04%, or less.

Gel Particles

Gel particles, such as the ones shown in Fig. 5, obviously cause an irregular surface. Gel particles can be eliminated by better mixing or homogenization during the processing. Actually, gels are a very minor cause of roughness.

Insufficient Feed Material in the Die

Fig. 6 shows the type of roughness that is caused by having an insufficient quantity of feed material in the die. This problem can be easily corrected by using a higher screw speed, thereby increasing the back pressure. Fig. 7 illustrates the relation between the extruder screw and the wire speed necessary to produce a back pressure sufficient to obtain smooth coatings. Obviously, if the wire speed is advanced without increasing the screw speed, the pressure in the die will drop and there will be insufficient material to give a uniform coating on the conductor.

Melt Temperature

Fig. 8 shows the results of coating wire with a melt that is too cold as compared with results obtained using a melt at optimum temperature. A coating produced from a melt that is too cold very noticeably lacks sparkle and luster. A melt temperature of 400°F. with all the heating zones at approximately 400° F. resulted in a slightly rough coating, using polyethylene with a melt index of 1.7 and a density of 0.918. Slightly rough coatings usually resulted also when die temperatures were

T.E.C. WIRE COATING GRADING SYSTEM

Fig. 1. Smooth

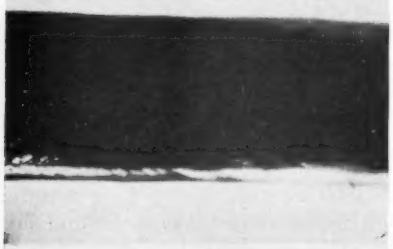


Fig. 2. Slightly Rough

Fig. 3. Rough

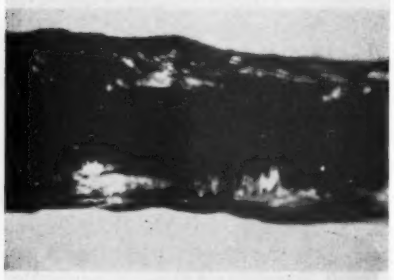


Fig. 4. Very Rough

FIG. 5 Gel particles

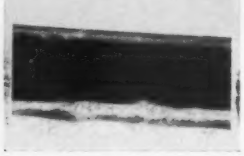
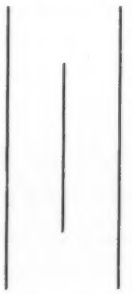


FIG. 6 Starved die



higher than the gate and cylinder temperatures.

* * *

The optimum conditions require the head and die to be approximately 100° F. cooler than the gate and the last heating zone on the cylinder. The melt temperature should be a minimum of approximately 440°F. for polyethylenes having a melt index of 1.7. Higher temperatures are necessary for lower-melt-index resins; however, higher temperatures for any resin improves the gloss and luster and reduces the build-up of extrudate around the orifice. Of course, optimum temperature conditions may vary with the equipment used.

Melt Fracture

Of all the different causes of roughness, melt fracture is the most important and the most difficult to eliminate. The phenomenon occurs in varying degrees, as illustrated in Figs. 1-4. It has been fairly well established that the occurrence of melt fracture is only at and above a critical shear rate in the tapers or inlets of the die. Two terms — shear rate and shear stress — are closely related to melt fracture. Shear rate, which is expressed by $\frac{4Q}{\pi r^3}$ is dependent on flow of rate (Q) in volume per unit time — that is, cu. in./sec. or cc/sec. — and on the radius (r) of the die opening or orifice. Shear rate is a measure of the rate at which individual particles of the melt slide past each other.

FIG. 7 The relationship between extruder screw speed and wire speed necessary for smooth coatings.

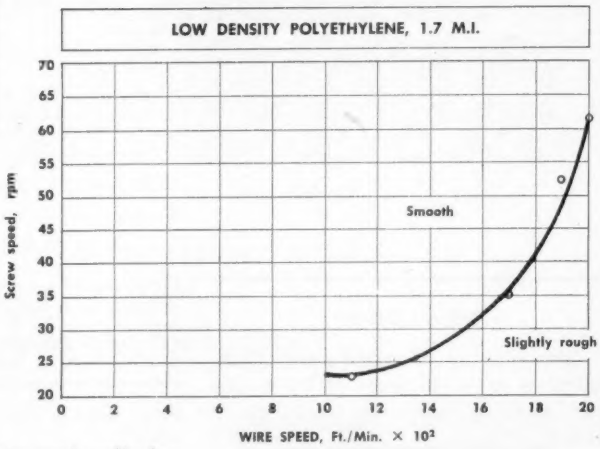
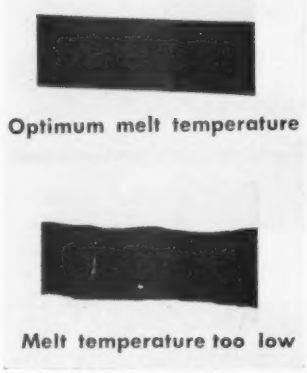


FIG. 8



Shear stress is the driving force acting on the individual particles and is expressed as the force per unit area, which is dependent on pressure and die dimensions. For a capillary, which is very similar to an orifice of a wire coating die, the shear stress is the product of the pressure and radius of the orifice divided by twice the land length.

* * *

Since melt fracture does occur at and above a certain critical shear rate, by changing certain variables it is possible to obtain a quality product by extruding below this critical rate. One variable that can be easily changed is the viscosity, which can be lowered by raising the temperature or by using a resin having a higher melt index. Higher temperatures lessen the resistance to flow and result in higher shear rates without occurrence of melt fracture. Since the resistance to flow is lessened,

the pressure is lowered and the shear stress is decreased. In certain instances, therefore, it is possible to eliminate melt fracture and maintain the desired throughput by raising the temperature and lowering the screw speed or pressure. Use of a resin that is less viscous or has a higher melt index has the same effect as raising the temperature.

Die Geometry

Flow Channel Tapers

If a good coating is not obtained by elimination of the causes of roughness that have been described, it will be necessary to modify the die design. Immediately, three questions arise:

(a) What should the angles of the tapers be?

(b) How long should the tapers be?

(c) How long should the land be?

It has been shown[1] that for the smaller cone angle, or taper, the higher will be the shear rate before the melt fractures. The taper must necessarily be long enough to have a diameter at the entrance of sufficient size that the rate of flow does not exceed the critical shear rate at that point. An ideal taper would be one with an infinitely small angle of infinite length. Obviously, this is not practical; therefore, the simplest approach is to have a larger taper or successively larger tapers prior to the final taper leading into the land. The best compromise then, is to program the rate of increase in shear rate by a series of tapers, as illustrated in Fig. 9.

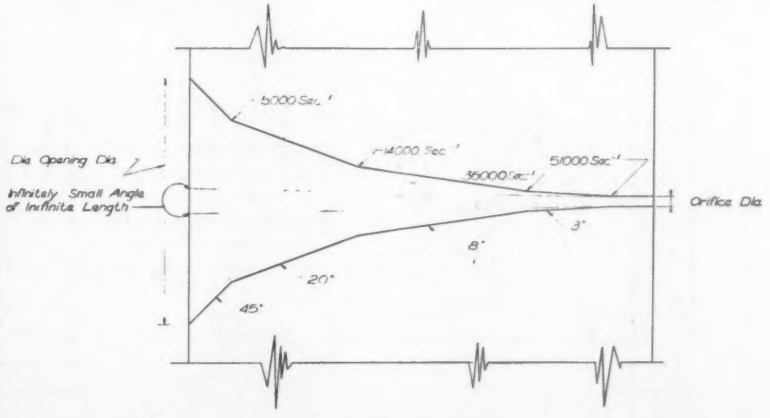


Figure 9 — Programmed Shear Rate

To determine the best taper angles,[1] five dies were made. Each die had an 0.044-in. orifice and 0.100-in. land, and the final tapers had included angles of 6, 8, 12, 30, and 180°, respectively. Two polyethylenes having melt indices of 0.3 and 1.7 and termed A and B respectively, were used with each die at various wire speeds in 200-ft./min. increments. The resulting coatings clearly indicated for each taper the critical shear rates for these resins.

* * *

As shown in Fig. 10, coatings from polyethylene A were smooth through 1200 ft./min. and borderline smooth through 1600 ft./min., using the 6° taper. Increasing the taper angles resulted in rougher surface coatings at lower wire speeds.

FIG. 10 Surface smoothness as a function of wire speed and die taper using 0.3 M.I. Polyethylene.

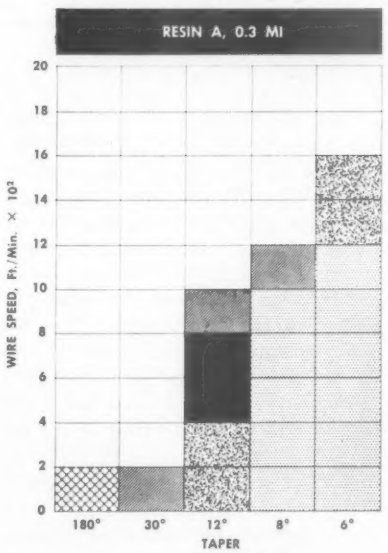
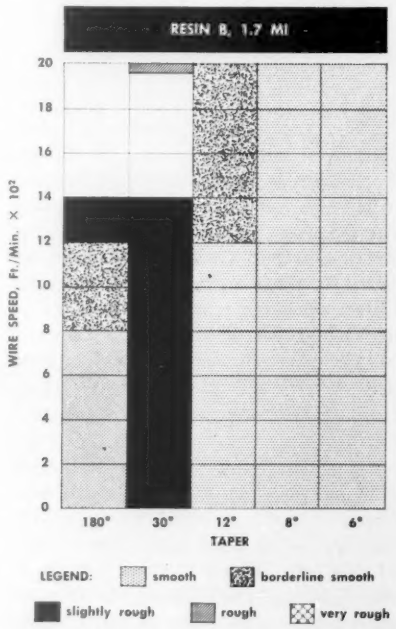


Fig. 11 shows that coatings from polyethylene B were smooth on both the 6° and 8° tapers at 2000 ft./min., while the 12° taper gave smooth coatings through 1200 ft./min. and borderline smooth coatings through 2000 ft./min. The coating was smoother at higher wire speeds and for larger taper angles with the 1.7 melt-index resin than for the 0.3 melt-index resin.

FIG. 11 Surface smoothness as a function of wire speed and die taper using 1.7 M.I. Polyethylene.



These data clearly show the break point at which the coating no longer remains smooth for a given taper and wire speed. It is desirable to know, relatively, what the shear rate values are at these break points. The highest shear rate value occurs where the final taper joins the land. In this instance, the radius at that point is 0.022 in. for each of the five dies and is the smallest radius encountered in the die flow channel. The shear rates for various wire speeds are shown in Table I.

* * *

Resin B gave smooth coatings at a shear rate of 73,000 sec.$^{-1}$ on both the 8° and 6° taper dies, while Resin A, the high-molecular-weight, low-melt-index resin, gave smooth coatings on the 6° taper up to about 44,000 sec.$^{-1}$. On the same taper the coating was borderline smooth to 58,000 sec.$^{-1}$.

TABLE I

Shear rates at various wire speeds for a die having a 0.044-in. orifice.

Wire Speed, Ft./Min.	Shear Rate, Sec.$^{-1}$
200	7300
400	14600
600	21900
800	29200
1000	36500
1200	43800
1400	51200
1600	58500
1800	65800
2000	73000

It was desired to design a die capable of giving a smooth coat with the most difficult resin to run, in this case the low-melt-index material; therefore, a value of 51,000 sec. $^{-1}$ was chosen as the maximum allowable shear. Since the shear rate is an inverse function of the openings or diameters throughout the flow channel, the rate of increase in the shear rate can be programmed. The highest shear occurs at the smallest diameter — in this case, the orifice of the die. From this point back, the flow channel diameter can be increased and the shear rate thereby decreased. The critical shear rates were determined experimentally from the five dies with the different tapers. A smooth coating at a wire speed rate of 2000 ft./min. was desired. It was therefore necessary to calculate the orifice diameter that would give this shear rate.

* * *

$$r = \frac{4(1256)}{51{,}000\ \pi} = 0.0314$$

* * *

The required diameter is therefore 0.0628 in.

* * *

Since the data showed that the surface remained smooth at higher wire speeds for the smaller tapers, it was decided in the design of this die to use a 3° taper for the first taper rather than 6°. The exit diameter of the 3° taper is the same as the diameter of the orifice.

It is desirable to keep the overall length of the die to a minimum; however, long tapers of very small angles theoretically would be ideal. Therefore, a compromise must be reached between the die length and angle of the taper since the angle of the taper indirectly determines the length of the die. A taper of 8° was chosen for the second taper. The highest shear rate without occurrence of melt fracture for an 8° taper was found to be 36,000 sec. $^{-1}$. The diameter required for the exit of the 8° taper, which is also the entrance for the 3° taper, is 0.089 in. since

$$r = \frac{4(1256)}{36{,}000\ \pi} = 0.0445 \text{ in.}$$

* * *

With this diameter and the orifice diameter, the length of the 3° taper can now be found.

$$\text{Length} = \frac{0.013 \text{ in.}}{\tan 1.5^\circ} = 0.496. \text{ in.}$$

* * *

The 12° taper gave melt fracture at approximately 22,000 sec. $^{-1}$. Since 12° is still fairly small it was arbitrarily decided to use a 20° taper with a shear rate value of 14,000 sec. $^{-1}$ at the exit diameter. A low value of shear, 5,000 sec. $^{-1}$, was assumed for the entrance of the 20° taper. The entrance diameter at the rear of the die requires an opening of 0.750 in. For connecting the die entrance diameter to the 20° taper entrance diameter, an agle of 45° was assumed. The diameters and lengths of the remaining tapers were then calculated as before. The tapers had the following dimensions.

Taper	Exit Dia., In.	Entrance Dia., In.	Length, In.
3°	0.063	0.089	0.496
8°	0.089	0.228	0.099
20°	0.228	0.640	1.170
45°	0.640	0.750	0.133

* * *

The land length, assuming arbitrarily a length-to-diameter ratio of 2, is therefore twice the orifice diameter, or 0.125 in. The total length of this die, which is shown in Fig. 12, is 2.914 in. This length is somewhat long for good operation since excessive drag through the resin causes the copper wire to stretch and possibly break. Generally, 1.5 and 2.0 in. is about the optimum length or distance of travel that 22 gauge wire can be pulled satisfactorily through low-melt-index polyethylene. A greater load is applied to the wire in pulling the wire through the die as the viscosity of the polyethylene increases. To reduce the length of wire travel through the resin, a guider tip with a needle-like nose was made to carry the wire closer to the front of the die.

* * *

Actual trials with this die resulted in borderline smooth insulation coatings with both resins A and B at a wire speed of 2000 ft./min.; however, this was not the fault of the die design. The head pressure was very low, being about 500-900 psi. This pressure was too low to assure a uniform flow in the die and around the conductor. Usually, a crosshead pressure between 2000-2500 psi. is obtained. The very slight roughness is of the type generally encountered at the very onset of insufficient back pressure in the die,

(*Please turn to page* 783)

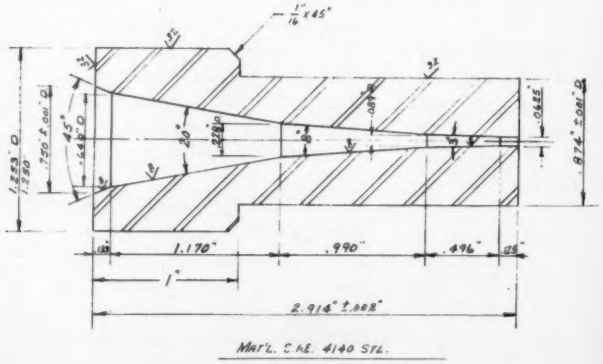


Figure 12 — Die Design based on experimental flow channel data.

Wire Mill Production Planning and Control

by F. Wilcox, Esq.
Rylands Brothers Limited
Warrington, England

This lecture was prepared for and presented before the Staff School at the Caledonia Works of Frederick Smith & Co. Wire Manufacturers Ltd. at Halifax, England, and is published through the courtesy and with the permission of the company.

The success of any project depends largely on its administration and organised control, and this is a subject that is constantly commanding greater attention from Management in all Industries. In the Wire Industry we have seen developments in administration, planning and control and no doubt present day ideas will give way to new methods some time in the future.

* * *

In a wire mill it is so important and necessary for all concerned to know not only what is going on, but to know what is following up; it is essential for plans to be made well ahead and for everything to be ready to meet them.

* * *

With these principles in mind, the general practices employed in a Rylands Brothers' wiredrawing mill are outlined. Firstly are given some characteristics of the mill which is equipped for the production of both mild steel and fairly high carbon steel wires within the size range of approximately 1.5 inches to .045 inches on wiredrawing machines of the single hole, two hole, three hole, four and six hole types. The mill is worked continuously by 8 hour shifts for a normal week of 126 hours.

Types of Machines

To give a normal weekly output of approximately 2000 to 2300 tons, the mill is comprised of:

Three	—	Single hole bull blocks
Four	—	Light single hole machines
One	—	Two hole machine
Ten	—	Three hole machines
Seven	—	Four hole machines
Four	—	Six hole machines

Bull Blocks

These machines produce sizes within the range of 1.5 inches to approximately .320 inches at speeds varying from 83 to 460 feet per minute and are driven by 65 horse-power motors. Since it is not desirable for these thicker wires to be welded to allow continuity, each single rod is pointed mechanically prior to drawing, and as this drawing process is not continuous, neither the dies nor blocks are water cooled. This section of machinery realises approximately 600/700 tons weekly, and normally each machine is manned per shift by one machine-hand and an assistant whose duties primarily involve the pointing or tagging of rods and loading of drum swifts by an overhead pneumatically operated hoist. For the finer end of this size range, a machine is manned by one operative only and he performs both the machine-hand's and assistant's duties.

* * *

Production from this class of machinery is generally for bolt-making, nut-making, rivet-making, chain-making, concrete reinforcement and nail-making.

Light Single Hole Machines

These machines produce sizes within the range of .320 inches to .156 inches at speeds varying from approximately 200 to 1,000 feet per minute and are driven by 33 horse-power motors. Continuity is achieved by butt welding of the rods so that it is possible to produce coils of wire weighing from 15 to 25 cwts. each, and as is to be expected with continuous drawing condition, dies and blocks are water cooled. This section of machinery realises in the region of approximately 700 tons weekly and the four machines are operated per shift by one machine-hand with one assistant to each machine for the general purpose of welding.

Three Hole Machines

At present, contrary to the general set up, one of these machines has been converted for two hole production and this machine invariably produces .144 inch wire. The other machines have a size range of .128 inches to .092 inches and run at a fixed finishing speed of 500 feet per minute. Again, these continuous machines require water cooled dies and cones. This section of machinery realises approximately 500 tons weekly and is manned by one machine-hand and three assistants per shift. It is possible to produce coils of wire weighing 10 cwts., and in the main, such coils are drawn on fixed strippers which in turn act as swifts in the galvanising, nail and fence departments.

Four Hole Machines

These machines produce sizes within the range of .092″ to .072″ at a fixed finishing speed of 750 feet per minute. Like all continuous machines, water cooling is required on the dies and cones. This section of machines realises approximately 250 tons per week.

Six Hole Machines

These machines produce sizes within the range of .072″ to .045″ and run at a fixed finishing speed of 1,000 feet per minute. Water cooling is again required to cones and dies, and approximately 100 tons per week is realised from this group.

* * *

The four and six hole machines are jointly manned by one machine-hand and three assistants per shift. The four hole machines produce coils of wire up to 10 cwts. in weight, whilst the six hole machines produce coils of wire up to 7 cwts.

* * *

The bull blocks are fitted with blocks of 26″, 30″ and 36″ diame-

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ter whilst the light single holers are fitted with blocks 22" and 26" diameter.

* * *

The three hole and four hole machines are fitted with 22" diameter blocks whilst the six hole machines have 18" diameter blocks.

Cleaning Department

An Acid Cleaning Department is situated adjacent to the wiredrawing mill and this supplies the mill with the bulk of its clean material, the balance being imported from one of our other cleaning departments. Material is cleaned in diluted sulphuric acid which is used in a concentration range of 13% to 1%, and which is contained in three tanks each with a capacity of 5,000 gallons.

* * *

A plant is being installed to recover the acid which will be kept in circulation. Material is cleaned at two tons per hook of rods, and approximately 1½ tons per hook of wire; the difference in weight being created by the varying coil diameters. At present the acid consumption rate is approximately 5 gallons per ton of material cleaned.

* * *

After pickling, the rods are high pressure hosed with water, and also immersed in water to remove any acid contamination. For sul coating, material is allowed to stand in the open air or in a "Scotch mist". This is followed by dipping in either a solution of Borax or boiling lime with subsequent ovening. The Cleaning Department is manned by two cleaners per shift and in each case one of them is responsible for the inspection and labelling of the material. Both these operatives are situated in an overhead electric crane.

Stockyard and Sidings

Rods are generally received by rail from our suppliers and we have a diesel locomotive operating in our private sidings, assembling loaded wagons under the stockyard cranes, reassembling empty wagons for their eventual return, and generally effecting the necessary movement of wagons and vans containing other incoming and outgoing goods. Where possible, rods are unloaded from wagons by the stockyard cranes and placed directly onto a conveyor which takes them into the Cleaning Department, but from time to time rods have to be unloaded and stocked. It is not uncommon for maybe 2,000 tons of rods to be situated on the stockyards at any one time, and it is important that an accurate stock be taken and submitted each day showing the qualities and tonnages.

* * *

A stockyard team comprises one crane driver and two assistants, along with a leading hand who organizes the movement of material to meet programme demands.

* * *

Annealing Plant

An Electric Furnace Annealing Plant completes the set up and the plant is comprised of eight units each consisting of four hearths. This plant processes approximately 300 tons weekly and is manned by three operatives per shift. In the main, wire for subsequent drawing in the wiredrawing mill is passed through this plant along with wires required in the annealed state for chain customers, rivet customers and others.

Production Planning

Production comes into two categories:

a. **Wire for further internal processing, such as for Nail making, Galvanising, Fence making, Cut lengths, Rope making, Cold Rolling and wire for further drawing down in other mills.**

b. **Wire for direct supply to customers.**

* * *

As a result of these two categories, orders are received by the wiredrawing mills:

a. **In requisition form from the Processing Departments.**

b. **In order form from the Works Sales Section.**

Generally, although this is not a rule, requisitions from the processing departments are received weekly and each item is specified for a certain delivery date. In the case of customers' orders from the Sales Section, these are received day by day and invariably a delivery date is stated. Whether requisition or order, the wiredrawing programme planner is required to ascertain the required method of production. Generally, the method

of production has been laid down by the Works Technical Department. It is the practice for programmes to be made up on a weekly basis and consequently it is necessary for all Processing Departments requiring wire from a wiredrawing mill to submit their requisitions on a selected day of each week, say Thursday.

* * *

On receipt of these requisitions, the programme clerk will enter them along with customers' orders on a weekly programme, having separated them into their various classes of production. The programme is then balanced against the capacities of the various classes of machinery until a satisfactory compromise is reached. Excess demands may be met by the working of overtime, but it should be appreciated at this point that there are other wiredrawing plants within the firm which make the distribution and balancing of weekly programmes fairly flexible. On the settlement of a weekly programme, it is then known:

(i) Just what we intend to produce, although there must be a sensible margin for sudden injections into the programme.
(ii) The plant, labour and working times required.
(iii) Rods and base material required.
(iv) Necessities such as dies, acids, lubricants, tools etc.

Annealing and patenting plants can then be advised of anticipated production for them and consequently their programmes can be arranged. Engineers can be notified of the working arrangements so that maintenance, repairs and modifications may be effected as necessary.

* * *

From the weekly programme, jobs are detailed to each individual wiredrawing machine on what is called a Daily Programme. This programme usually covers 24 hours by three eight hour shifts. The planner allocates a job or a number of jobs to each machine giving the full details of the requirements:

Amount
Size and drawing tolerance
Basic rod/wire size and quality
Destination
Weight of coil
Label or tin tally
Special instructions

Before this daily programme is issued to the Mill Foreman, the planner arranges to have the required rods assembled under the stockyard cranes and available for moving into the Cleaning Department.

* * *

A shift programme is issued to the stockyard leading hand and this advises the rods or wire required with the amount, size and quality and the type of cleaning and finish desired.

* * *

As material is loaded on to the conveyors which transport it into the Cleaning Department, a blackboard is filled in by a stockyard hand declaring the contents of the conveyor, i.e.:

No. of coils
Size and quality
Cast Number
Type of cleaning finish required.

This is for the benefit of the cleaning operatives who are situated in electric cranes above floor level and who in turn fix a label to the finished material giving the aforementioned details.

* * *

The Mill Foreman is then given a clear and advanced picture of what is to be produced and the clean material should follow through in its right proportion; some prompting will be required from time to time by the Mill Foreman, but generally, his time is well spent in supervising and general mill control.

* * *

Machines must not be allowed to be delayed for material, and to this end all wiredrawing machines are adapted with twin flippers.

* * *

After drawing, production is weighed by means of Ram Trucks over a weighing machine operated by a Weights Clerk who will book the following details:

Date and shift
Machine Class
Job Detail
Machine Number
Base size and quality
Cast Number
Number of coils
Weight in decimals

* * *

These recordings are in turn submitted to the Mill Office and hence we get the figures for workers' piece rates and ancillary labour bonuses, order control and records and various other statistics.

Rods

All rod requirements are submitted to a Rod Controller by all rod consuming departments, and following assessment and conjecture with stocks, the controller is able to arrange his requisitions for material from the source of rod supply each Friday.

* * *

A normal weekly requisition for the whole concern is usually within the region of 4000/4500 tons, and each item is ordered for a specific time of delivery so as to meet with the demands for the drawn wire.

* * *

It can be appreciated at this point that this requisition will in turn be the basis for programme arrangements at the place of the rod suppliers.

* * *

To a programme planner, SERVICE must be the foreword, and service cannot be attained without a well organised production control.

* * *

Broken or missed promises and production bottlenecks can usually be ascribed to the lack of planning or to poor planning and it is in the avoidance of such pitfalls that efficient production control can give optimum service to customer and supplier alike.

* * *

Of the attributes required in a programme planner, personality is probably the foremost; he must possess the ability to get on with departmental heads and yet be firm enough to insist on his own right in the proper execution of his function. A likeable personality, one who gets along with everyone, is not necessarily desirable.

* * *

A planner must have a sixth sense of anticipation and possess analytical ability; he must be at ease with figures and have a sound sense of estimation and production rates. Practical experience in the processes involved is a de-

(Please turn to page 778)

Covering Materials for Line Wire and Service Drop Cable

by

D. B. Cofer
Technical Supervisor
Southwire Company
Carrollton, Georgia

and

Floyd Wirsing
Assistant Professor
West Georgia College
Carrollton, Georgia

This paper discusses the chemistry of various forms of polyethylene and compares properties from the point of view of utility for the service indicated.

The use of plastic materials for wire coverings is commonplace in our plastic age. So desirable are the properties of these new plastics, and so often do they appear on the market, that one must continually make himself aware of new products available superior to the one now being used. Such is the case with chemically cross-linked polyethylene which has appeared on the market recently. Essentially the one being used is a conventional polyethylene loaded with carbon black although the loading could be other materials. When the material is heat cured, usually called vulcanization, there occurs a cross-linking or an interlinking between the carbon atoms in the molecule. This vulcanized interlinked polyethylene we propose to call VIP, and it will be referred to by that name in this paper. The object of this research is to ascertain how VIP compares with neoprene and polyethylene for line wire and neutral supported service drop cable. Factory produced coils of the three substances were made and identical tests applied to each under the same conditions.

* * *

In order for us to predict and interpret the results, a brief look at the chemistry of neoprene, polyethylene and VIP is in order. Several definitions may also serve to clarify or refresh someone's chemistry. Polymerization involves the union of two or more molecules of the same substance to form a compound, the molecular weight of which is a multiple of that of the original substance. The chemical differences between thermosetting and thermoplastic materials are that heating changes and molecular weight and chemical structure of the former and not of the latter. Cross-linking is the bonding between two or more of the individual long molecular chains. If cross-linking is carried far enough, the material decomposes before softening and is classed as thermosetting. Thermoplastic materials generally have relatively long molecules with little or no cross-linking and hence are plastic. Thermosetting materials have many cross-linkages which account for their resistance to softening on heating.

* * *

Neoprene is the trade name for polychloroprene which consists of hundreds of chlorophene units added to each other in chain fashion. The conditions of manufacture involve emulsification, a catalyst, and the proper time and temperature. The polymerization is a typical 1-4 addition reaction with the double bond shift to the center. The neoprene molecule is very large and could be represented by $(—CH_2CCl=CHCH_2—)x$ where x is a large number. The end product is usually masticated to give the desired physical, electrical, chemical and weathering properties. It requires vulcanization as the final step. The superior qualities of neoprene plastics can be fully utilized by the proper selection of fillers, anti-oxidants, vulcanates, plasticizers and accelerators.

* * *

Polyethylene is the polymerization product of ethylene. The conditions of the original process involve a small amount of peroxide catalyst, moderate temperatures (250°C) and high pressures (1500 atmospheres) to give the solid polymer, polyethylene. Under the influence of the double bond, one ethylene unit after another adds on to a growing chain. The formula for polyethylene could be considered $(—CH_2CH_2—)y$ where y is probably some number between 100 and 1000. The final chains may be linear, or branched, or bent back on themselves to form 5 membered and 6 membered rings. The molecular weight varies as the density, which is an index of its structure. The higher the density, the greater the degree of linearity. The are also low pressure processes. One developed by Karl Ziegler of Germany uses a new type catalyst with slightly elevated temperatures and atmospheric pressure. Advantages of the low pressure process are evident from the fact that eight U. S. companies promptly obtained Ziegler licenses. The low pressure process gives polyethylene of greater linearity than the earlier conventional material as there is an in crease in density from 0.92 to 0.96.

* * *

The chemistry of the cross-linking of polyethylene is not known completely, because of the large size of the molecule, and difficulty in molecular weight determinations. The bonding between atoms varies greatly. There is not sufficient unsaturation due to double bond formation in polyethylene to account for as much cross-linking as must occur. Actually, the molecular weight of cross-linked polyethylene molecules often approximates thousands, so that other conditions must exist to promote such extensive cross-linking. Of several possible explanations, one of the more plausable would involve the free radical concept. The formation of free radicals would most likely occur when there is considerable chemical activity. The peroxides are relatively unstable

chemically and hence very reactive. Moreover, the organic peroxides are widely used industrially in cross-linking polyethylene, and thus could furnish many free radicals. Also it is well known that the hydrogen on an alpha carbon atom of unsaturated carbon linkage possesses unusual reactivity. Bonding could occur between these active hydrogen atoms and the free peroxide radicals to give many cross-links between chains of different molecules as well as between branches of the same molecule. We have considered the terms vulcanized interlinked and cross-linked as the same thing. Vulcanization as applied to rubber chemistry like cross-linking of polyethylene, involves the formation of macro molecules from smaller units. Similarly, vulcanizing methods are satisfactory for cross-linking polyethylene.

* * *

The compounds selected for this research are the ones normally used for their superior weather resistance, nominal electrical properties, and economy. The neoprene and polyethylene were made from inventory of factory stock normally used. The VIP samples were taken from an initial factory manufacture. The neoprene meets the requirements of ASA C-8.34, and IPCEA S-19-81, part 7 Section 7.9. Polyethylene meets the requirements of ASA C-8.35, IPCEA S-19-81, part 7 Section 7.9 and ASTM D 1248-52T Type II, Grade 6, general purpose black. The VIP compound was designed to meet the requirements for both line wire and service drop cable as outlined for neoprene and polyethylene. The VIP and neoprene were extruded on a No. 3 Royal CV machine with a double extended screw. They were vulcanized at 225 psi in open steam at 400°F. The polyethylene was extruded on a 4.5 inch Davis plastic extruder cooled initially in warm water and finally in room temperature water. All wire sizes were No. 4-7 AAC with 3/64 insulation. The nominal current rating of all conductors with a conductor temperature at 60° C in 115 amperes.

* * *

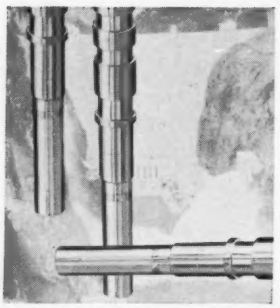
The effect of flame is the first consideration. The Underwriter's Laboratories test for flammable materials was used. Essentially this is the application of a flame to an 18 inch sample in a test chamber for 15 seconds after which the flame is cut off for 15 seconds. This process is repeated four times. The neoprene and VIP did not flame at all; but the polyethylene, a thermoplastic material, caught fire on the first application and burned up completely. A thin strip ⅛ x ⅛ inch of VIP and neoprene before they are applied to the wires burned very slowly in air. However, when placed on a flat plate, both went out. Probably on the finished wire the inside conductor leads the heat off.

* * *

Heat deformation of these materials was done by a Williams plastometer similar to ASTM D 926-56. However, since the primary interest is a comparison of these coverings, instead of using press cures, samples of the finished wire were used. The sample and plastometer were put in a 70°C ± 1° oven for one hour to get them to the oven temperature. Instead of using the whole area of the parallel plates, a strip of polished steel exactly one inch wide and ¼ inch thick was placed so that the wire sample would be at a right angle to the one inch plate. The sample was properly placed, the 5000 gram load lowered and readings taken directly from the dial micrometer on top of the plastometer. The oven temperature was raised by 10°C intervals and corresponding readings taken on the micrometer. The difference between the original reading at 70° C and the micrometer reading at the 10° intervals was divided by the original 70°C reading to give a measure of the deformation. These values were plotted versus the temperature (Figure I.)

* * *

To ascertain if the VIP was completely cured or cross-linked in the manufacturing process, several samples of VIP were kept at 320°F for one hour. These were allowed to cool and 24 hours later deformation values were obtained and plotted. It would seem from the graph that the original VIP was completely cured, or very nearly so as the curves almost co-



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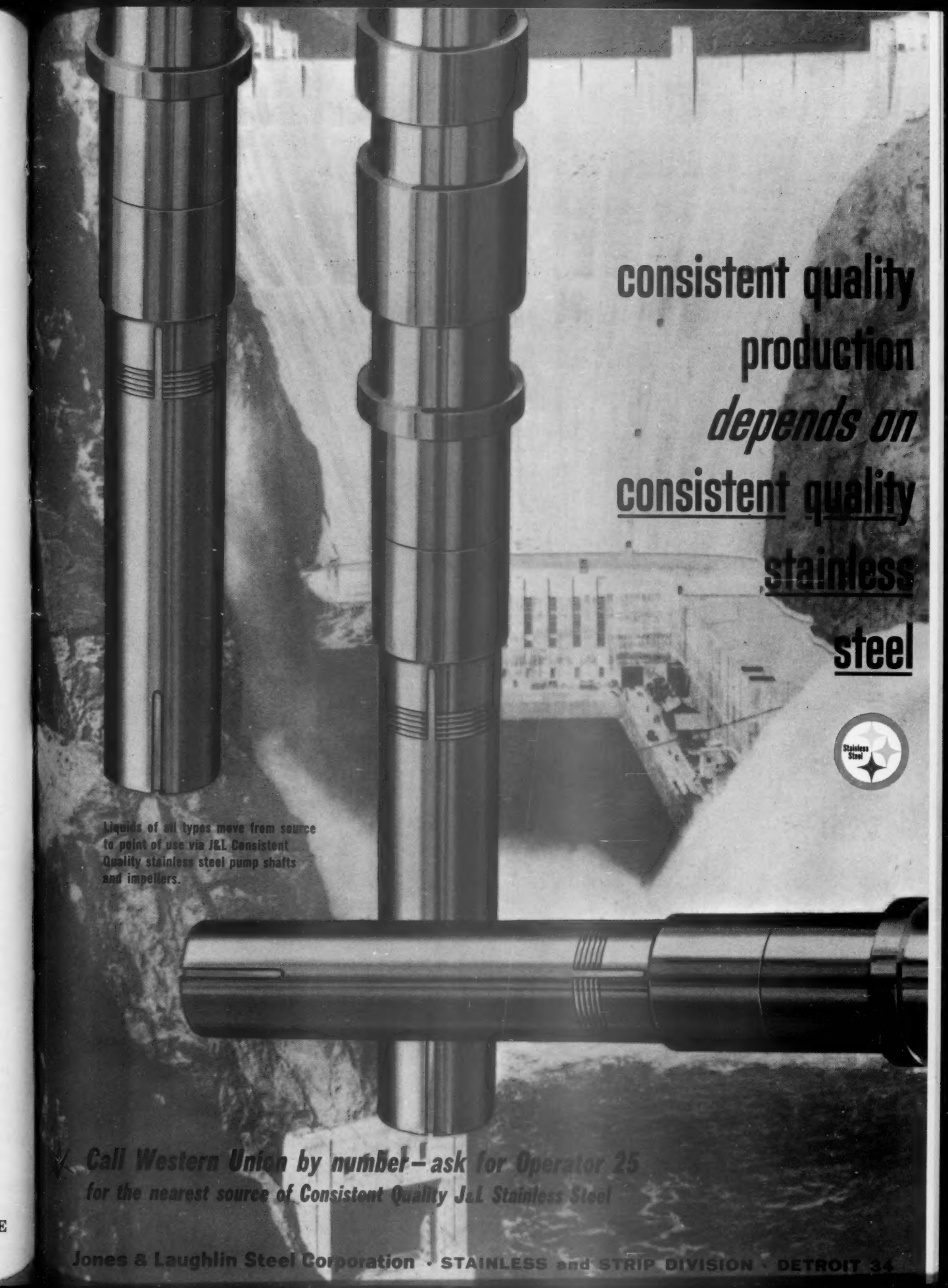
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incide. The curves show significantly the differences in the three substances. Polyethylene at higher temperatures breaks down completely. As regards heat, VIP is considerably more stable, but less stable than neoprene. A similar trend was observed in the stability of the covering as regards heat when electrically overloaded.

* * *

TABLE I

V I P		POLYETHYLENE		NEOPRENE	
AMPS (AV.)	VOLTS TO FAIL(1)	AMPS (AV.)	VOLTS TO FAIL(1)	AMPS (AV.)	VOLTS TO FAIL(1)
250	11,000	263	16,000	250	16,000
363	11,000	357	16,000	370	16,000
460	9,000	450	5,500	450	16,000
500	15,000	---		508	16,000
575	10,000	---		600	16,000
625	6,500	---		625	11,000
	8,400 (2)		16,000 (2)		16,000 (2)

(1) 16,000 Max. of transformer - no failure.
(2) Average of 4 control samples.

In the overloading studies, six samples each of VIP, polyethylene and neoprene were subjected to varying currents. Four control samples of each covering, that were not overloaded, were run simultaneously. After these samples were thoroughly cooled, they were immersed in a water test tank, hooked to an auto-transformer for testing dielectric having a range up to 16,000 volts. The samples were kept at 1500 volts for one minute and then the voltage increased gradually until failure, or until no failure had occurred at 16,000 volts. To bring about overloading one meter of the sample was clamped across the annealing terminals of a 550 volt welder for exactly one minute. Different settings of the welder provided different amounts of current for the six samples of each material. The current was measured by a clamp-on ammeter and varied according to the setting from 250-750 amperes. Polyethylene could not be used for any current higher than 450 amperes as any greater amount was sufficient to melt the insulation off the wire.

* * *

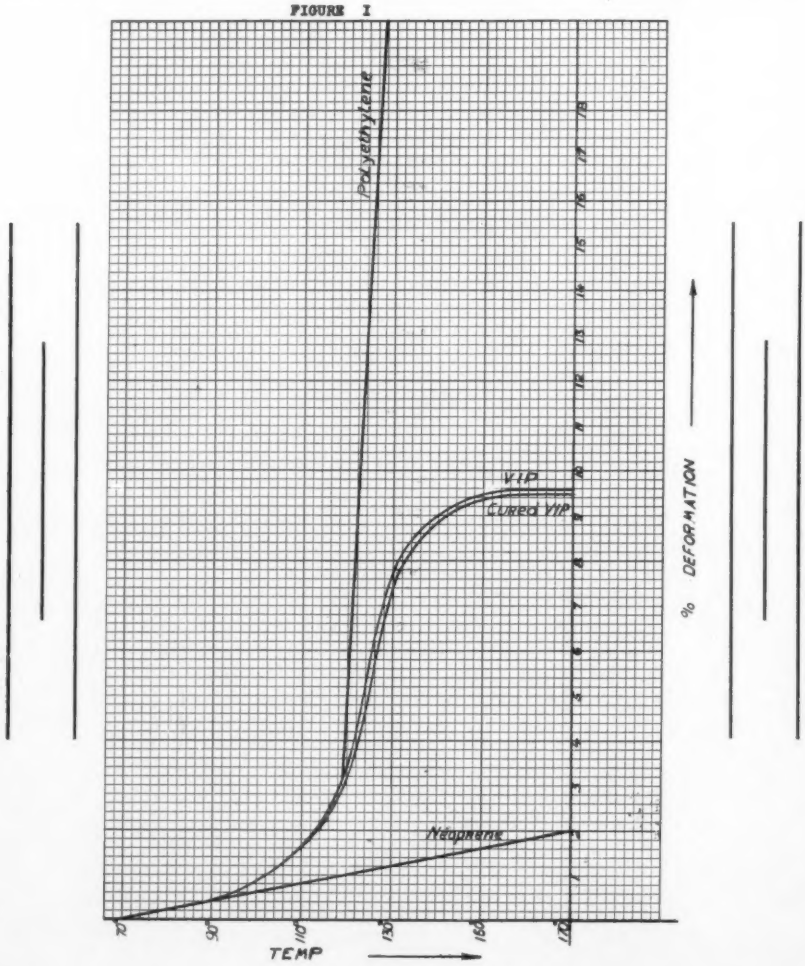
The conclusions of Table I are quite evident. As one would expect if the amperage gets high enough, deterioration of the insulation will cause dielectric failure. (The samples with the highest amperage were smoking plenty before the one minute was up.) VIP is inferior to neoprene and polyethylene in regard to dielectric. Of course, all are far above the usual standards of 1500 volts for one minute. It is possible that more thorough mixing of the carbon black or changing conditions at the extruder might improve the dielectric values for VIP. This indicates that a simple laboratory dielectric test could be used as a measure of carbon black dispersion. It is interesting to see what happens, if after moderate overloading, the samples are heated in an oven, or put in the oxygen bomb before being immersed in the water tank. This was done using moderate amperages between 250 and a maximum of 400 amperes. After cooling, some samples were put in the 70°C oven for 168 hours and others were put in the oxygen bomb for 96 hours at 70°C and 300 psi. In neither case did the neoprene or polyethylene fail. The VIP from the 70°C oven failed at 9000 volts, and from the oxygen bomb failed at 11000. Apparently these aging conditions had no effect.

* * *

Moisture absorption tests indicate that VIP is superior to polyethylene and neoprene. Two samples of each of the three materials were used. Samples 30 inches long were wrapped around a mandrel having a 1.5 inch diameter. The ends were dipped in melted paraffin (M. Pt. 140-142°F). The first

(*Please turn to page 773*)

FIGURE I



Accoustic Irradiation Used in Descaling and Cleaning Wire

Translated by
Dr. Jerome W. Howe
Worcester, Massachusetts

This article, which appeared in the March, 1959, issue of Draht-Welt, is published through the courtesy of the publishers of the magazine.

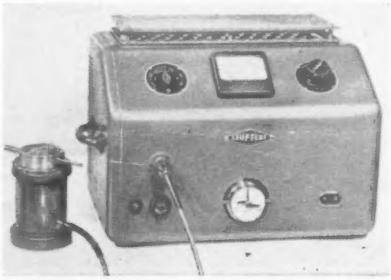
In the chemical pickling process wire is commonly pickled in a 5 to 20% solution of sulphuric acid at temperatures of from 40 to 60 degrees centigrade, with the addition of an inhibitor and non- ionized wetting agent. The result of the acid action on the wire and its quality is variable if the wire is descaled partly in a fresh pickling bath and partly in a solution nearly saturated with iron sulphate. Especially, where the grooves in the wire surface still covered by scale have not been completely eliminated by the pickling.

* * *

In order to correct this, chemical pickling processes have been developed with supplementary acoustic irradiation using intermittent frequencies. A particular advantage of this method consists in the elimination of the so-called sound-shadows, so that the acoustic irradiation acts upon the entire wire surface.

* * *

Very rugged and relatively inexpensive accoustic irradiation apparatus can be installed, because of its small dimensions, in any pickling plant. The chemical pickling process combined with acoustic irradiation always produces economically a uniformly and satisfactorily descaled and cleaned wire of the highest quality, which, after subsequent rinsing and drying, can be electrolytically galvanized, hot galvanized or lacquered. Any electrolytic treatment requires a satisfactory cleaning of the material. With wire, this is accomplished in a degreasing bath connected in the series. The descaling, which can be under-



Acoustic radiation apparatus to provide intermittent frequencies.

taken for mill scale in an appropriate electrolyte and with freqencies from, for example, 5 to 50 Hz, can include an anodic luster treatment.

* * *

In order to attain the highest economy of this process, the wire must not be laid in the electric circuit over contact sheaves, but must directly constitute the reciprocal pole of the bath electrode; for example, by applying the voltage to the reel. In this way partial sparking between the wire and the contact sheave is avoided, which leads to a martensite residue on the surface of the wire and wire breakage, as well as increased wear on the drawing dies.

* * *

With an electrolytic wire cleaning and descaling unit 30 feet long, wire from one to six mm in size can be handled at speeds of from 10 to 30 meters per minute. As a source of alternating current either a transformer (50 Hz) or a single phase frequency generator (5 to 20 Hz) may be used, according to the type of scale. The current strength required lies between 5 an 15 amperes per square decimeter of wire surface.

* * *

The electrolytic process above described takes place, with the exception of the necessary provision for drying the wire, at room temperature, so that the cost of heating is eliminated. As contrasted with the chemical pickling process with the heating expense, the alternating current process offers the additional advantage that the saturation point of the pickling acid in iron sulphate (360 to 400 grams per liter in the purely chemical process) can be raised to 600 gr. per liter. Of further importance it should be noted that the drainage loss on the small quantity of wash water used in the several steps of the process is reduced. The very extensive variability of the alternating current process makes possible several operations: cleaning only, cleaning and descaling, or simultaneous anodic burnishing.

* * *

This process is advantageously adapted to the perfect cleaning of copper and alloy wire; for example, as preliminary to an immediately following lacquering or enamelling step. The cost of the alternating current process is no higher than that of acid descaling, and in some cases it is lower.

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New Vacuum Hopper Extracts Water and Air from Vinyl Insulation Prior to Extrusion

by

Neil T. Flathers[1], Robert E. Johnson[2], Vernon R. Pallas[3], and Dr. W. Mayo Smith[4]
Escambia Chemical Corporation
Research Center
Wilton, Connecticut

A relatively simple method of over-coming liability to porosity due to the presence of moisture and air in resins has been developed, the results of which are described herein.

Economical non-porous extrusion of vinyl insulation direct from PVC dry blends with electrical and physical properties superior to those of insulation produced from more expensive diced compounds has become possible.

* * *

Our staff has found that an efficient vacuum hopper eliminates the major causes of porosity and rough surface in the extruded insulation by removing moisture and entrapped air from the dry blend prior to or immediately after entrance into the extruder cylinder. In addition, the use of the vacuum hopper produced vinyl insulation with higher insulation resistance values, greater retention of elongation after oven aging, and complete freedom from porosity.

* * *

The vacuum hopper has provision for continuous constant level feed of the dry blend into the hopper from an outside source without interruption of the vacuum. For most efficient operation, it is essential that dry blends having good flow properties be used.

Figure 1 — The vacuum hopper, shown above installed on an extruder, removes moisture and entrapped air from dry blends before entering the production cycle. Improved PVC electrical properties and appearance have resulted. * * * * * * *

Escambia PVC resins of the 1000 series and Escambia PVC Pearls of the 2000 series are well suited for electrical insulation extruded from dry blend with a vacuum hopper. Because of their capability for hot dry blending readily at high plasticizer levels and with polymeric plasticizers, these resins yield dry blends of outstanding flow behavior. Our research report on the vacuum hopper extrusion of PVC dry blends describes results using a 2½" 20/1 L/D National Rubber Machinery extruder and a National Rubber Machinery vacuum hopper.

* * *

This report details the results on three electrical compounds which have been vacuum extruded from dry blends as coatings 1/32" thick on #14 AWG wire. Extrusion with the vacuum hopper resulted in complete elimination of porosity, improved retention of elongation after oven aging and higher insulation resistance values compared with insulation extruded without vacuum. The degree of porosity, reported as percent, was measured by the difference in the specific gravity of the porous insulation and the non-porous milled compound. The enlarged photograph in Figure 2 shows a cross-

(*Please turn to page* 777)

1. Technical Service Department.
2. Technical Service Department.
3. Mgr. Technical Service Laboratory.
4. Vice Pres. & Director of Research.

Table I
Properties of Three PVC Compounds Extruded from Dry Blend Effect of Vacuum Hopper

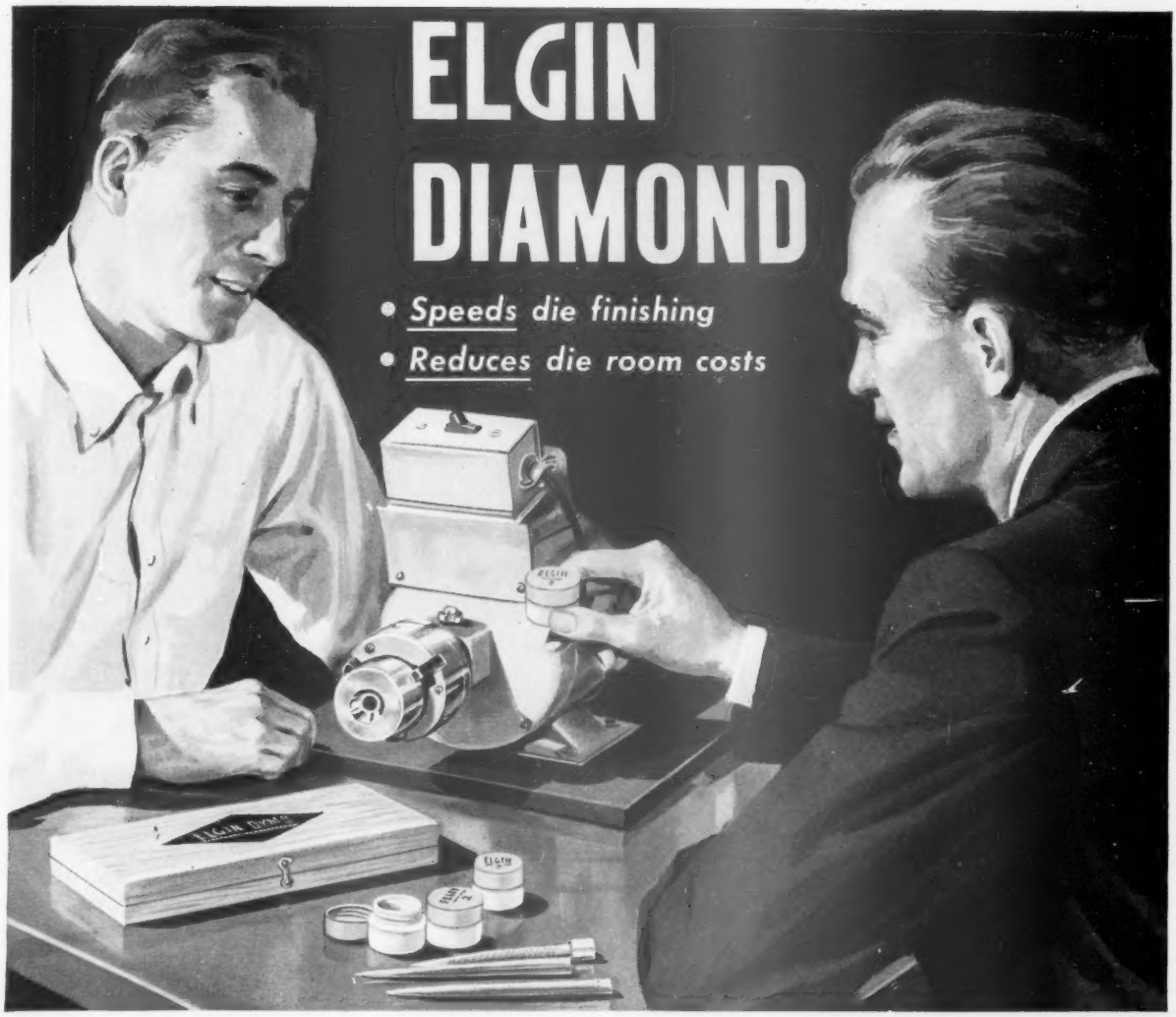
Compound**	Vacuum, Inches	Porosity %	Retention of Elongation After Aging, %	Insulation Resistance Megohms-1000 feet				
				-5.6°C.*	50°C.			
					1 Day	1 Wk.	6 Wks.	12 Wks.
A	None	2.00	72	3100	88.1	150	221	261
	28.4	0	85	3050	96.9	178	256	286
B	None	1.10	68	2740	70.0	108	180	224
	25.5	0	76	2763	67.5	118	194	238
C	None	2.92	76	1040	25.0	43.3	60	67
	25.5	0	88	1140	25.8	43.8	64	68

* After 24 hours at room temperature and 1 hour at 15.6°C.

** A - TW, 60°C building wire compound - added flame resistance.
B - TW, 60°C building wire compound.
C - 80°C appliance wire compound.

Table II
Effect of Extrusion at Various Levels of Screw Cooling With and Without Vacuum Hopper

Screw Water Temp., °F.	Wire Speed FPM	Porosity %	Compound B Retention of Elongation After Aging, %	Insulation Resistance Megohms-1000 feet				
				15.6°C	50°C			
			Without Vacuum	1 Day	1 Wk.	6 Wks.	12 Wks.	
70	160	1.10	68	2740	70.0	108	180	224
85	165	1.43	73	2688	63.3	100	170	214
150	200	1.88	80	2788	71.3	116	190	235
No water	305	5.04	70	2850	70.0	111	178	225
			With Vacuum					
70	150	0	76	2763	67.5	118	194	238
85	160	0	79	2775	73.0	134	225	268
150	190	0	84	2670	71.0	120	200	240
No water	250	0	89	2650	70.0	124	203	244



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Determining the Thermoelastic Properties of Metals and Alloys

The elevated temperatures attained in the power plants of modern aircraft have developed a need for improved spring materials; however, basic data on the thermoelastic properties of metals and alloys must first be accumulated before these materials can be designed. To provide such information, the National Bureau of Standards has devised two techniques, one utilizing a pendulum assembly to test wire specimens, and the other, a sonic vibration technique to test solid materials.

In a study sponsored by the Navy Bureau of Aeronautics, The **National Bureau of Standards** has adapted two simple dynamic techniques to the determination of the thermoelastic properties of metals and alloys. One method utilizes a pendulum assembly to test wire specimens, and the other, a sonic vibration apparatus for rods and prisms.

* * *

Information derived with this equipment, designed by **H. C. Burnett** of the Bureau staff, may be used to develop improved alloys for spring materials. The elevated temperatures attained in the power plants of modern aircraft have created a need for metal springs that maintain stable deflection characteristics over a wide range of environmental conditions. However, to design alloys for these springs, basic data are necessary on the elastic constants of materials suitable for spring fabrication.

* * *

The equipment used in the pendulum method consists of an oven, photoelectric cell and lamp, timer, counter, and electronic temperature recorder. A frame about the oven supports a 3-foot long, 0.5 in. diameter steel rod that extends vertically through a hole in the top of the oven into the heat chamber. The wire specimen is suspended from a chuck on the lower end of the rod. Another chuck, firmly fixed to a 6-in. diameter brass disk, grips the lower end of the specimen. When a small amount of twist is applied with a starting arm fitted to the upper portion of the rod, the pendulum oscillates about the axis of the specimen.

* * *

The photoelectric cell and lamp, mounted just outside the rear of the oven, are alined with two holes in the oven wall. Once in each half cycle of oscillation, light from the lamp strikes a small mirror attached to the pendulum assembly, and is reflected back to the cell. The cell, thus energized, operates the counter and timer until a predetermined number of oscillations is registered. The shear modulus of the wire is then computed from the resonant frequency derived for the specimen and the dimensions and masses of the pendulum assembly. The frequency range of this test is from a fraction of a cycle to 10 cycles per second. Test temperatures up to 525°F are shown on the temperature recorder.

* * *

In the sonic vibration method, either a rod or a rectangular prismatic bar specimen, approximately 6 in. long, is suspended from an electromagnetic driver by two asbestos strings and enclosed in a furnace which operates at temperatures up to 1000°F. The specimen is excited to its resonant frequency by the driver and a variable audio oscillator. A crystal pickup detects the vibrations which are shown as an expanded wave on a cathode ray oscilloscope. The frequency of the oscillator is then adjusted to the frequency of the specimen, indicated by the amplitude of the oscilloscope trace, and this adjusted frequency is measured with an electronic events-per-unit-time counter.

* * *

From the measurements thus obtained, Young's modulus can be computed for rod specimens. In using the apparatus for tests on rectangular prismatic bar specimens, the prisms can be made to vibrate either in tension or torsion, so that both Young's modulus and the shear modulus may be determined without changing the mode of suspension.

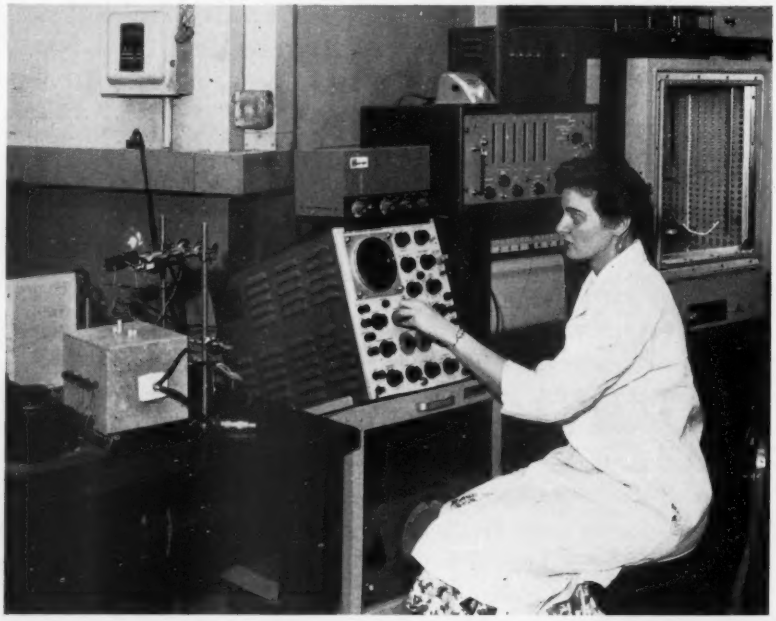

Figure 1 — Equipment developed at the National Bureau of Standards to determine the thermoelastic properties of metals and alloys. Here Miss Ruth E. Dowden is adjusting the cathode ray oscilloscope used in the sonic vibration method for solid materials. A specimen, suspended by two asbestos strings, may be noted above the furnace to the left. At the extreme right a wire specimen, held between two chucks, is ready for test by the pendulum method.

* * * * * * * * * * * * * * * * * *

New Freedom in Casting Design Achieved with Stainless Steel Braid

This article describes an interesting application of stainless steel wire that improved the quality of castings and reduced rejections.

A new, removable coring material made of stainless steel braid permits new degrees of freedom when designing intricate internal passages in magnesium castings. The core material eliminates costly machining and external piping, upgrades the value of scrapped castings, and reduces the occurrences of blows (or voids) in the castings. The removable coring is used in a patented casting process by Howard Foundry Co., Chicago.

* * *

Cores are made of stainless steel tubular braid designed and manufactured for Howard by the **National-Standard Company,** Niles, Michigan. Intricate, curving passages in the castings can be designed without restrictions imposed by the limitations of drill jogs or of less versatile core materials.

Venting Gases

The coring problem first arose during efforts to improve magnesium castings for such applications as aircraft fuel control blocks. Gases form when hot metal touches an organically bonded core. These gases are difficult to vent when core diameter is small and core length is great. If such gases are trapped and cannot escape, they may bubble through the casting metal, causing internal bubbles known as "blows." Furthermore, long thin sand cores distort during the casting process.

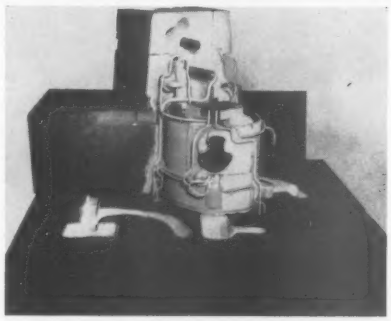

Figure 1 — Partially assembled sand mold shows intricate pattern of cores sheathed with stainless steel braid. Thirteen cores are used. Total length of cores is over ten feet. *

To overcome these difficulties, sand cores are often replaced by metal-tube cores that are bent into shape. After casting, the metal tube is dissolved out or left in. Many combinations of tubing and sheathing are used by Howard to cast internal passages in other metals. But the problems of casting magnesium with long, thin cores defied the existing combinations.

Try Stainless Over Copper

To solve the problem, Howard wanted to use cores made by slipping the stainless steel braided sheath over copper tubing. After the casting is poured and cools, the copper would be dissolved out with a 50-50 mixture of 70% nitric acid and 70% hydrofluoric acid. The stainless steel sheath would have to be flexible enough to be pulled out after the copper tubing is dissolved and washed out.

* * *

National-Standard engineers were consulted when the stainless steel braid was first being considered. Existing stainless steel braids were found to be too coarse. But National-Standard developed a braid made out of 0.0036-inch diameter Type 304 stainless wire. This small-diameter wire is the key to the flexibility and porosity needed for the braid. It is flexible enough so that a ⅜-inch diameter braid can be pulled through a ⅛-inch hole.

Adopt Six Standard Sizes

To make up the sheath for the copper tube, a number of wires are beamed together. These strands are then beamed to form the tubular stainless steel sheath. Either 24 or 48 groups or carriers are used, depending on final braid diameter. Howard has adopted six braid diameters as standard for cores from ⅛-inch to ⅜-inch diameters. Sand is used for cores of larger diameter.

* * *

This coring system is used to make castings where great freedom is needed in designing pas-

(*Please turn to page* 782)

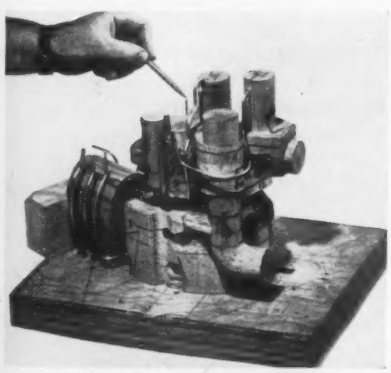

Figure 2 — Pine mockup shows design freedom available when laying out cores. * *

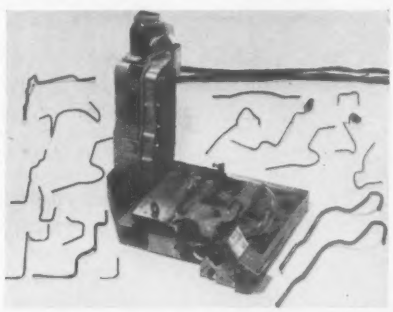

Figure 3 — Tube bending fixture is relatively simple. Core tubes at right have been sheathed with stainless steel braid. "Corks" on sheathed tubes help locate holes in castings. Tubes (left) bent into cores are ready for braid (top). * * * * * * * *

Figure 4 — Typical braid for cores is made of 0.0036-inch Type 304 stainless. * * *

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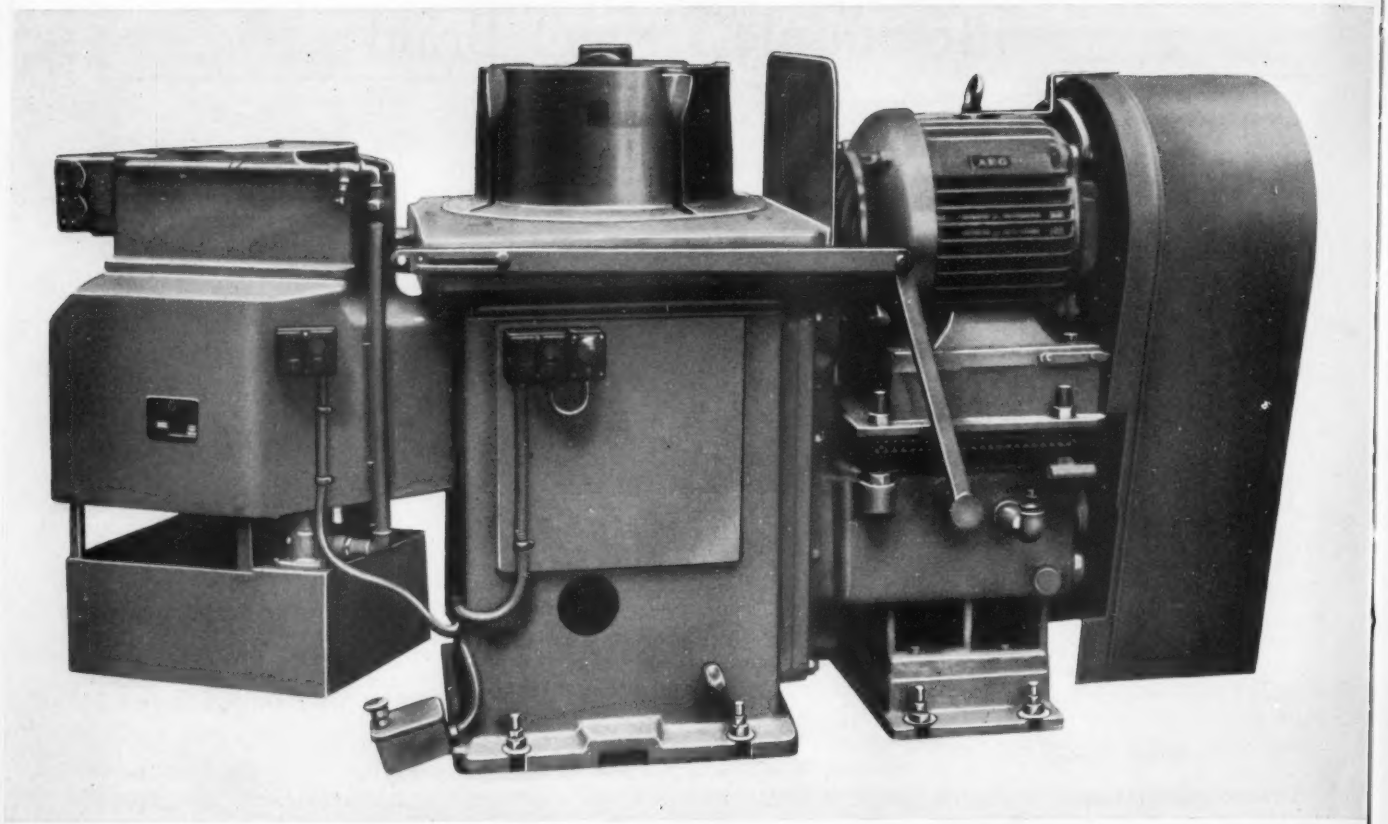
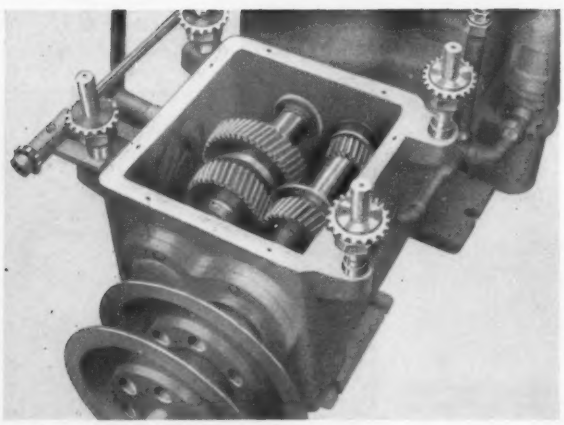


Wire Drawing Machines



Type GZK Heavy Wire Drawing Machine of vertical block design,
maximum traction power 10 tons (22000 lbs), block diameter 800 and 600 millimeters (32 and 24 in.), machine can be supplied for straight-line drawing too.

Type MZK Medium Section Wire Drawing Machine of vertical block design,
maximum traction power 3000 to 800 kilos (6600 to 1750 lbs) corresponding to block diameter of 550, 450 and 320 millimeters (22, 18 and 12.$^1/_2$ in).
Double deck blocks on demand.

Type NZK Wet Drawing Machine, up to 25 dies, block diameter 275 or 210 millimeters (11 or 8 in.) for coil removal and with spooler up to 45 kilos (100 lbs) capacity.

Type FZK Fine Wire Drawing Machine, up to 24 dies, with spooler up to 2,5 kilos (5.$^1/_2$ lbs) capacity.

Type SZK Copper Rod Shaving Machine,
maximum entry size 15 millimeters (.590 in.),
block diameter 600 millimeters (24 in.).
All the Drawing Machines except the Heavy Wire Type can be equipped with infinitely variable speed drive.

Auxiliary Equipment
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Further Comments on Wire Rope Testing

Mr. van de Moortel answers and comments on some questions raised during the discussions following his paper.

At the Annual Convention of **The Wire Association** last October in Cleveland, the paper written by **Denis G. van de Moortel** of the **United Rope Works,** Leiden, Holland, was read by **Thomas Melville** of **American Steel & Wire,** due to the author's inability to be present. His paper, entitled "A New Method for Fatigue Tests on Steel Wire and Wire Ropes and The Viewpoints Opened by the Results Obtained," was published in the October, 1959, issue of **Wire and Wire Products.**

* * *

An active discussion ensued, which was printed in **Wire and Wire Products** in January, 1960, starting on page 69. M. Melville and Mr. Brown, who assisted in answering questions, were at some disadvantage, not having all of Mr. van de Moortel's unexpressed data in mind.

* * *

Mr. van de Moortel has made some additional explanatory comments in a letter, the main points of which are published to clarify some issues raised.

* * *

Mr. Brown: There is not enough information in the paper.

* * *

Comment: I would like to note that I was asked to make my original paper considerably shorter and less technical. I did this and Mr. Melville also shortened the presentation further, so that it lost some of its clearness thereby. I greatly regret that I could not have attended the Convention myself and delivered the paper, although I am grateful that Mr. Melville was willing to do it.

* * *

Mr. Brown: We know nothing about the machine and how it performs.

* * *

Member: Does he say anything in the paper about the number of revolutions?

* * *

Comment: I felt sure that the photo of the machine for combined fatigue, the description, and the statement about the sheave measures would be sufficient to make clear how the machine performs. Only the speed at which the test pieces run over the sheaves was not given; it is 7 feet per second.

* * *

Mr. Gray: You have no information on this superior grade of steel?

* * *

Comment: To develop a superior grade of steel wire, a long series of tests were made on different kinds of steel as to chemical structure, different places in the ingot, where the rods were rolled, air and lead patenting, combined with adapted, different grades of cold drawing, bright and zinc coated by different methods, and so on. Contrary to what was presumed, I did not restrict the tests to steels of European origin. In fact, some were grades of steel drawn by some of America's best known wire mills and one of the ropes mentioned in Graph V was fabricated in the U.S.A. in traction quality. I did not feel that this should be mentioned, because I did not want to hurt the national pride of some suppliers.

* * *

Possibly because of this I was greatly surprised by Mr. Brown's remark: "There is a lot of difference between European and American ropes. We do not feel that we have to take a back seat to any European rope."

* * *

I personally am familiar with the quality of European wire and wire ropes, and I belive his inference regarding all European wire rope manufacturers is rather broad and would not be borne out by the facts. Moreover, I do not think that anywhere in my paper did I advertise wire or wire rope of one origin or another.

* * *

My aim was to point out the new possibilities offered by the machine for combined fatigue, as I designated it. The results mentioned were only given to prove that the method of testing described can be very useful. The tests are promising in that they enable us to develop a grade of steel wire that can compete with the best known steel qualities, in spite of the fact that our wire originates from ores that are by far not as pure as those used in America.

* * *

The comparative tests, made on ropes of different constructions, had to be made on ropes manufactured in the same plant, as I wanted to avoid the possibility of obtaining dissimilar results caused by differences in fabrication. I can state definitely that the test pieces were all made according to standard practice.

* * *

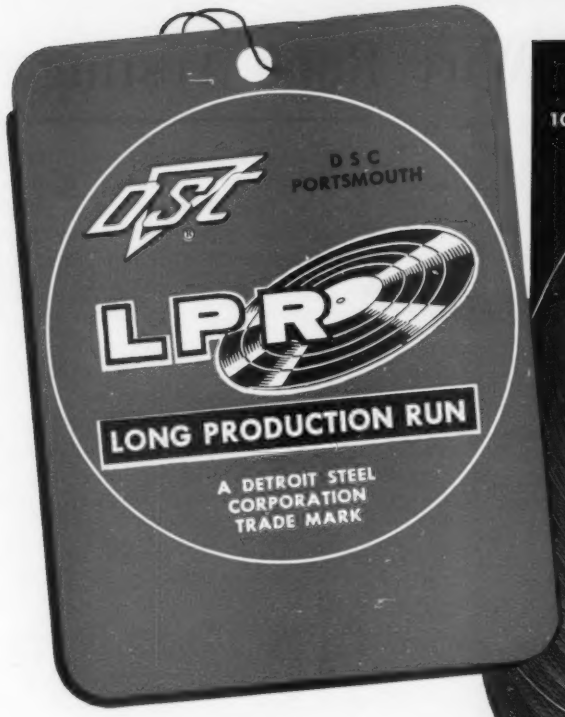
Mr. Brown: Our rope experience does not confirm all the conclusions he has drawn in his paper.

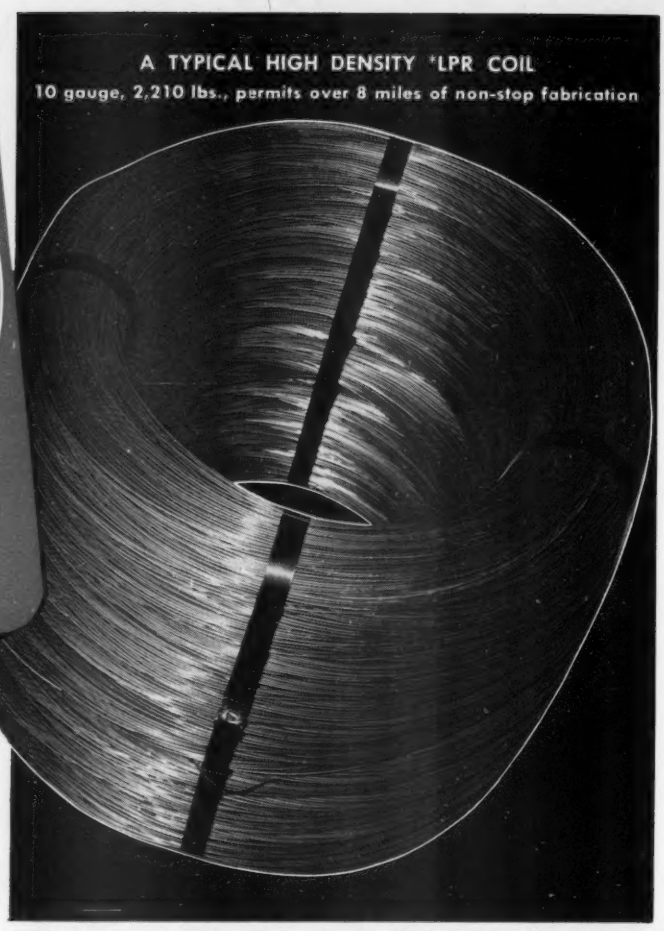
* * *

Comment: It will surely be understood when I ask in what manner Mr. Brown comes to differing conclusions. Perhaps the matter could be investigated further to learn what these other conclusions are.

* * *

I am thankful to the Convention for the frank manner in which my paper was discussed. I would appreciate the bringing of the foregoing points to the attention of the Association members, especially to those who were present at the Annual Convention.





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In this department will be published helpful hints on how to do things and the questions asked by our readers on wire processing problems, together with the answers and comments thereon received from the field. In no instance will the identity of the persons asking for advice or of those supplying it be published.

Our readers are invited to send helpful contributions and to submit questions on their technical problems to the Editor. These will be answered from information on hand or from the field, when it becomes necessary to secure counsel from that source.

Removal of Scale and Rust

QUESTION

We draw coiled rod to the extent of 40 to 50 tons daily and at the present time we are using mechanical descaling. We are not able to remove all of the mill scale and rust from our rod and along with our present pickling facilities for the wire we draw, we cannot clean properly and galvanize in the allotted time we now have. We weave chain link fabric from this wire and have a time element of 4½ to 5 minutes for pickling the fabric before it is galvanized, using a 10% or better solution of muriatic acid at room temperature. The tank is a brick lined one, 50 ft. long, 4½ ft. wide and 3 ft. deep, holding a total volume of 1500 gallons. We need a scale or rust removing agent that will completely clean the chain link fabric in 4 minutes. Can you secure information that will help us?

ANSWER

Reply No. 1.

With reference to your letter regarding question of wire cleaning raised by a reader, we have the following advice: With mechanical descaling, no doubt a metallic soap is used as the drawing lubricant. Consequently, a good cleaning should include:

1. **Hot alkaline degreasing**
2. **Hot water rinse**
3. **HCl pickle**
4. **Water rinse**

Recommend heating acid to 140/160°F.

Reply No. 2.

In attempting to answer your letter regarding the cleaning of wire mechanically descaled, we would suggest that if the user of this material has not tried heating the muriatic acid to a temperature between 100° and 180°F, that could be a possible solution, or using a higher acid concentration, possibly around 20%.

* * *

I believe the use of a shot blasting to descale and clean might be a solution, as it would naturally mean that waste acids then would not be a factor.

* * *

We are hearing more and more about stream pollution, and we will be forced to discontinue dumping acid into natural water courses.

Reply No. 3.

Your letter requested some information as to the pickling of chain link fence, which was made from wire drawn from mechanically descaled rods.

* * *

I have inquired from one of our divisions but they do not have very much information along this line, as they do not manufacture much tonnage from mechanically descaled material. The only thought I can offer is that your reader might try putting some heat into the acid bath. Perhaps if the temperature were kept somewhere between 125 and 140 degrees F, they might have better success in their pickling operation.

* * *

Another thing that might affect this cleaning is the type of scale which is on the rods. We have difficulty in drawing wire through mechanical descalers if the rods have a very heavy scale from having been rolled at high temperatures, which might results in secondary scale on the surface.

Making Nails

QUESTION

I am a student at the University of ———— and would appreciate your sending me some information on the process of making nails for a term paper.

ANSWER

The process of making nails is a relatively simple one, provided one has coils of nail wire and nail making machines.

* * *

Nail wire can be of any ferrous or non-ferrous metal such as steel, copper, brass, bronze or aluminum. The great bulk of the nails manufactured are of low carbon steel, but brass, copper and aluminum account for a considerable volume.

* * *

Nails come in a very great variety of sizes and shapes — some 1000 to 1200 sizes and types.

* * *

Nail machines produce nails continuously, with a wide range of machine sizes capable of producing nails from small heads to large bridge spikes ten or more inches in length.

* * *

The wire is fed into the machine, held by grippers that form the little serration under the head to give the nail holding power. While being held in the gripper the wire is sheared off, a hammer up-

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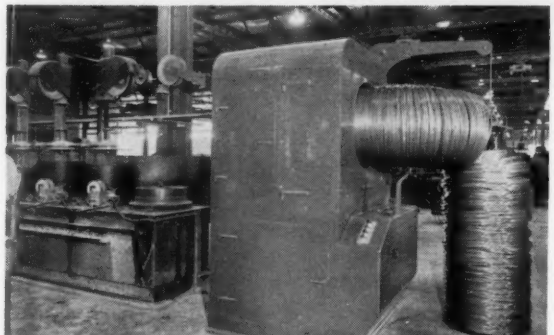

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Wire Kinks

sets the head, and almost simultaneously tungsten carbide cutters point the nail end. It all happens so quickly that it is hard to follow with the eye and the nails literally pour out into a container.

* * *

Many variations of head sizes and shank shapes are produced by suitable dies or grippers. The threaded or screw nail, which you have probably seen, is either formed by a subsequent rolling operation, or by having a rotating die that gives the wire its screw form just prior to its being fed to the nail machine. This last is coming to be the more accepted practice.

* * *

Nails were first made in this country in 1645 by slitting sheet into strips and hammering the strip into shape and upsetting the head by hand hammering. This was at Saugus, Mass.

* * *

In 1777 Jeremiah Wilkinson of Cumberland, R. I., is said to have invented a cold slitting machine for cut nails.

* * *

In 1790 Jacob Perkins of Newburyport, Mass., invented a better nail cutting machine that did away with the home manufacture of nails.

* * *

The first nail machine for the manufacture of nails was made in 1851. It was a French invention for making iron and brass nails. These were still cut nails.

* * *

The big revolution in nail making came in 1875 when a steel wire nail machine was produced. Steel, incidentally, had not been made until a few years before this. Steel is a combination of iron and carbon. Cut nails had practically disappeared by 1883, from which you can judge that all nail makers did not adopt the new method of producing them immediately.

* * *

Following the production of modern nails, they are placed in "de-whiskering" barrels and tumbled to get rid of the sharp slivers left by the pointing dies.

* * *

Many types of nails are also galvanized, aluminized, or cement coated for corrosion protection. This is done in heated tumbling barrels where the plating is done with metals.

* * *

Nails also are cleaned and sterilized, weighed and packed automatically, as most carpenters put a handful in their mouths when working.

* * *

While most steel nails are made of low carbon steel wire (carbon content .05% to .15%), some are made of medium carbon steel (.15% to .40%). Very few are made in the high carbon ranges, which would run from .40% to 1.0%. These would have great strength and hardness.

* * *

The matter of having the wire properly lubricated for its passage through the nail machine is important. Nail wire is therefore usually drawn with a special lubricant that remains on the wire to a sufficient degree to retain the required lubricity.

* * *

You might write to any one of the large companies who make nails for their nail catalog to give you an idea of some of the shapes and sizes made.

Metallic Wire Coatings

QUESTION

Could you give us a little background on the coating of wire with metals?

ANSWER

Coating one metal with another became commercially possible toward the end of the 18th century. Coatings serve many purposes, as for protection against corrosion, for decorative purposes, for electric conductivity, to facilitate the drawing of wire, or to improve adherence of a material like rubber to wire, as in tire bead wire.

* * *

The oldest and most common method is by the hot dip process, in which a wire is immersed in a molten bath of a metal of lower melting point than the base metal. Such processes are used for applying zinc to steel, tin or tin-lead to copper, tin to steel, aluminum to steel, brass to steel, lead to stainless steel, etc.

* * *

Then came electrolytic plating in which the more common applications are zinc to steel, nickel to steel or copper, silver and gold to copper, bronze to steel, and cadmium to steel. Electrolytic plating has gone through many refinements, the end of which are not in sight, although current processes privide excellent results.

* * *

Other processes, both developed by Copperweld Steel Company, involve the application of copper and aluminum to steel billets to produce heavy coatings that retain their relative thicknesses

(*Please turn to page* 789)

ASTM Standards on Copper and Copper Alloys

This new compilation contains 137 standards of which 17 are new, revised or have had their status changed since the previous edition in 1957. In addition to standards for cast and wrought copper and copper alloys, the book contains some material on non-ferrous materials for electrical conductors, certain selected specifications on non-ferrous metals and alloys for primary forms of copper, zinc, lead, and nickel used in copper-alloy products.

* * *

The standards include methods of test, definitions, specifications, classifications, and recommended practices applicable to copper and copper alloys, filler material, pipe, tubes, wire, rod, bar, shapes, die forgings, plate, sheet strip and rolled bar. Copper-alloy ingots and castings are also covered.

* * *

Copies of this book may be obtained from ASTM Headquarters, 1916 Race St., Philadelphia 3, Pa. at $7.50 each. 720 pages, hard cover, 6" x 9".

New "Economy Line" Spark Tester

A new spark tester designed to provide effective insulation testing at the lowest possible price is being manufactured by **Enjaco Corporation,** 100 Glen Road, Cranston, R. I. One of a series of units to be sold under Enjaco's new "Economy Line", the sparker incorporates both the 10 milliamp controlled power testing circuit and the electronic fault detection circuit which are featured in the higher priced National and Imperial models. Units are available in the following voltage ranges: 1-5 kv; 1.5-7.5 kv; 2-10 kv; and 3-15 kv. For further details write: Enjaco Corporation, Box 3674, Cranston 10, R. I.

New Enjaco Spark Tester

Scott Testers Announces Three Advanced Physical Testers

Automatic, fingertip controls featured on the Model CRE Constant-Rate-of-Extension Tester, the Model STI Mooney Viscometer, and the Model E Brittle Point Tester help to make a wide range of physical testing procedures simple and accurate. These three testers will be displayed at the ASTM Show in Atlantic City, N. J., from June 26 to July 1.

* * *

The Model CRE Constant-Rate-of-Extension Tensile Tester features an ultra-precise electronic weighing system and push-button controls, providing an infinite variety of crosshead speeds, a wide selection of interchangeable test capacities, and instant response to

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rapidly fluctuating loads. It is useful for testing tensile and tear strength, high and low elongation, and other physical qualities.

* * *

The Model STI Mooney Viscometer has pneumatic-powered controls that close dies uniformly and eliminate physical effort or tedious adjustments. This Shearing Disc Viscometer meets all requirements of ASTM Designation D1646 and ISO/TC45 Proposals 411 and 440. Precise temperature control within ½° at operating temperatures to 400°F is possible.

* * *

The Brittle Point Tester — the compact, lightweight Model E — already is known to rubber technologists. Designed with fingertip controls located on a single front panel and working on a solenoid-actuated principle, the Model E is extremely positive in operation. Controls are included for heating, stirring, and firing the solenoid which actuates the guillotine. It conforms with ASTM Designation D746 on vulcanized rubber and other elastomers.

* * *

For information on these three fingertip-controlled testers, write **Scott Testers, Inc.,** 55 Blackstone St., Providence, R. I.

New Wire Rope Announced

The Colorado Fuel and Iron Corporation has announced the development of a new wire rope, Double Gray X, which is tougher and longer-lasting than its premium rope, Double Gray. The new rope is the result of the development of a new wire drawing technique by CF & I Wickwire's research laboratory and wire mill at Palmer, Mass.

* * *

Double Gray X is made from extra improved plow steel with independent wire rope core and has 15% greater breaking strength than the rated breaking strength of improved plow steel wire rope. The independent wire rope core is made from the same specially drawn wire as the surrounding rope strands. One of the important factors in the successful development of this new wire rope is

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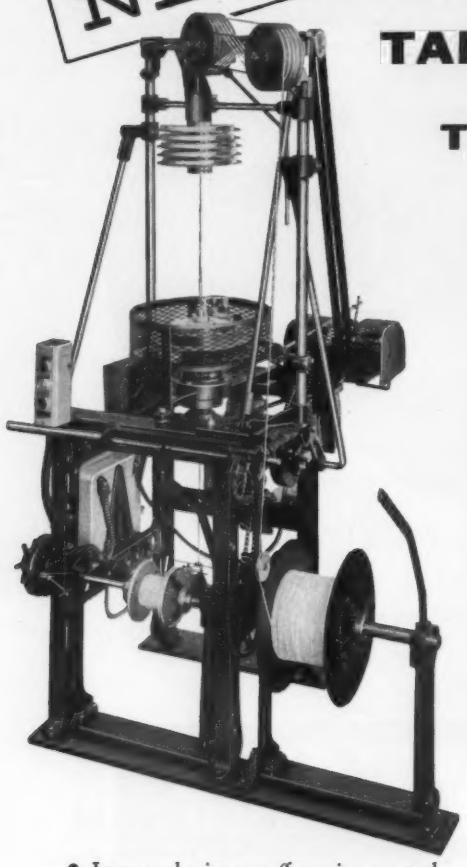

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the use of molysulphide in the wire-drawing process, which builds a thin, permanent molecular shield around each wire which helps separate the wires and cushions them against the effects of bending, crushing and abrasion.

Information on Vinyl For Building Wire

Physical and electrical properties of Opalon 1040, Monsanto Chemical Company's new vinyl compound for insulating type THW building wire and cable, are detailed in a company publication for the wire and cable industry.

* * *

Results of oven-aging and comparative long-term water immersion tests at 75 degrees Centigrade as well as other performance data are presented to support the company's claim that its new insulation compound is outstandingly suited for THW usage.

* * *

Copies of the publication may be had on request to Department 713, Monsanto Chemical Company, Springfield 2, Mass.

New Furnace Bulletin

Sunbeam Equipment Corp., 180 Mercer St., Meadville, Pa., has published a six-page bulletin covering its full line of industrial furnaces for heat processing. The bulletin includes a special selection guide designed to enable one to select the proper equipment in relation to his particular process requirements.

* * *

Copies of the bulletin may be secured by writing the company.

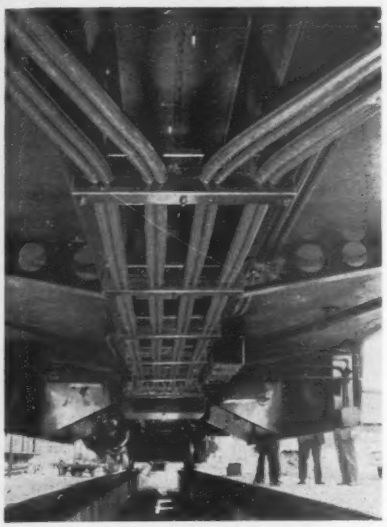
New Coaches Using Aluminum Cable

Recently acquired double-deck commuter cars put into service by the Chicago & North Western Railway are wired for electric heating, air conditioning and lighting with aluminum conductors.

* * *

The 480 volt, 3-phase power from a diesel-driven alternator on the locomotive is transmitted to each car through 250 MCM single

conductor aluminum cable that is rubber insulated and neoprene sheathed. Each car requires 1200 feet of cable that is installed in four runs of three cables each cleated to the underside of the cars.



View of underside of coach showing open installation of aluminum cable. * * *

Kaiser Aluminum & Chemical Sales, Inc. supplied the cable, which is said to have provided savings of 30% over copper. Because the cars are not burdened with steam pipes and electric generators, it was possible also to cut their weight by 10 tons compared with conventional double-deck units.

New Folder on Bunchers

Entitled "Constant Tension for Precision at High Speed", a four-page folder has been issued by **Haskell Dawes Machine Co.,** 2231 E. Ontario St., Philadelphia 34, Pa., that describes the features of the new line of wire bunching machines. Copies of the folder are available upon request to the company.

Bulletin on Galvanizing Lines

Lee Wilson Engineering Co., 20005 Lake Rd., Cleveland 16, Ohio, has issued a new bulletin entitled "Lee Wilson Continuous Wire Heat Treating and Galvanizing Lines", picturing and describing their radiant tube method, a process pioneered by them. Copies are available on request.

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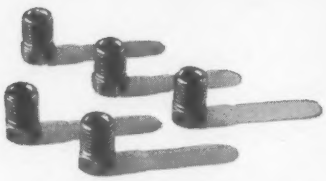
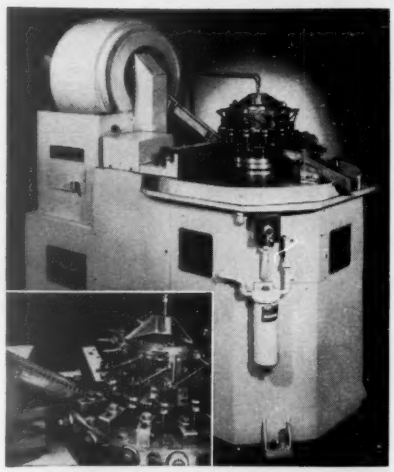


IF YOU ARE NOW BUYING tube nuts like these, you can cut costs by heading them yourself and roll-threading the hollow parts on a Prutton Model 300. You can buy cheaper stock (rolled wire) and make your own parts.

IF YOU ARE NOW MAKING THESE PARTS ON A SCREW MACHINE, you can get "cold forged" quality faster for less than the cost of cutting or grinding. No need to buy expensive hex-stock. And, you eliminate these screw machine operations: drilling, turning, chamfering, threading, and cut-off.



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Dept. WP

Please send information on Model 300 Thread Rolling Machine.

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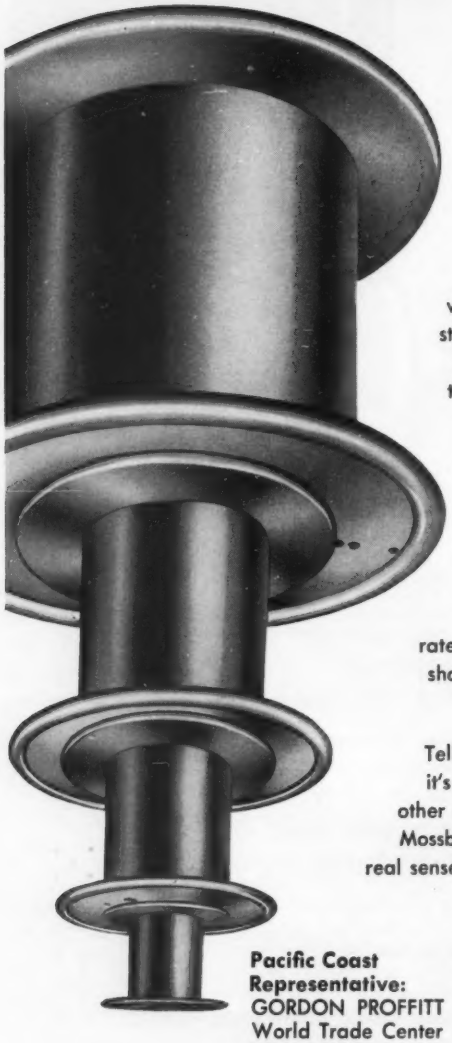
APCO *All-Steel* Reels for Safety and STRENGTH



The Strength Of All-Steel Construction makes Apco Mossberg reels, spools and bobbins perfect for high-speed wire processing. Rugged reels of steel won't buckle, bend, gouge or burr. Extra safe and durable through repeated handling and processing . . . Apco reels maintain their trueness and balance on the arbor. Each is machined to close tolerances for long-wearing, trouble-free use that keeps your wire waste down and production rate up. Available in a variety of shapes and sizes to specifiaction. Prompt delivery.

Tell us your reel problem, whether it's for drawing, stranding or any other type of wire processing. Apco Mossberg has the answer that makes real sense. Write, wire or phone collect.

Pacific Coast Representative:
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47 Colbourne Street, West
Toronto, Ontario, Canada

APCO MOSSBERG COMPANY
LAMB STREET, ATTLEBORO, MASSACHUSETTS

Translations Available

The British Iron & Steel Research Association has announced the availability of the following foreign language articles that have been translated:

1131 D. Horstmann: "The adhesive strength of zinc coatings on heavily-coated, hard-drawn wires of rimmed low-carbon steel." Stahl u. Eisen, 1958, Oct. 16, pp. 1456-1462. (£3 10 0). (Abstracted in the J.I.S.I., 1959, July, p. 310b.)

1245 H. Eicken and W. Heidenhain: "The effect of drawing speed, reduction in cross section and carbon content on the mechanical properties of drawn steel wires, power requirements in drawing." Stahl u. Eisen, 1924, Dec. 18, pp. 1687-1694. (£3 10 0). (Abstracted in the J.I.S.I., 1925, vol. 111, pp. 569-570.)

1277 W. Mallach: "The sulphuric acid regeneration plant in the acid circuit of a wire pickling shop." Draht, 1958, Sept., pp. 335-342. (£6 10 0). (Abstracted in the J.I.S.I., 1959, June, p. 183b.)

1279 F. Neuberger: "Improving the wear resistance of dies by treatment with colloidal graphite." Fertigungstechnik, 1956, July, pp. 321-323. (£3). (Abstracted in Fortnightly List no. 54.)

1281 A. Petzold: "Investigations on pickling baths." Metalloberflache, 1955, Dec., pp. 205A-207A. (£2). (Abstracted in the J.I.S.I., 1956, Oct., p. 234.)

1245 Eicken, H., and W. Heidenhain: "The Effect of Drawing Speed, Reduction in Cross Section and Carbon Content on the Mechanical Properties of Drawn Steel Wires, Power Requirement in Drawing." Stahl u. Eisen, 1924, Dec. 18th, pp. 1687-1694. (£3 10s. 0d.) The influence of speed of drawing on steel wires containing 0.26 per cent. and 0.83 per cent. of carbon is investigated and the results are shown in tabular form and in diagrams. One set of tests was made in which the reduction was 15 per cent. draught, a 5-millimetre wire being drawn down to 2.7 millimeters.

1277 Mallach, W.: "The Sulphuric Acid Regeneration Plant in the Acid Circuit of a Wire Pickling Shop." Draht, 1958, Sept., pp. 335-342. (£6 10s. 0d.)

These may be ordered from the BISRA. Other translations on other phases of steel processing are similarly available. Requests for lists of translations as issued should be directed to the above.

New Riveting and Sealing Method for Freight Car Doors

Fasteners & Wire Products, Bara Birwa, Alambagh, Lucknow, India, manufacturers of headed and threaded fasteners, has devel-

oped a tool called "Steel-Rivet", designed especially for sealing freight car doors. It replaces lead seals, ordinary rivets and other products used conventionally for the purpose.

* * *

The invention consists of a semi-tubular rivet with cross holes in its shank and a hand press tool to accomplish the sealing and make a code impression. Wires may be threaded through the cross holes to attach labels.

* * *

A folder illustrating and describing the method in detail may be secured by writing the company.

Bridgeport Brass to Buy Plant in Ohio

Bridgeport Brass Company has revealed plans to acquire a government-owned metal working plant in Warren, Ohio, that it will convert into an aluminum mill at a cost estimated to be $16 to $18 million.

* * *

Production will start in the summer with the manufacture of 24-inch aluminum strip. Eventually, the plant will become an integrated mill, complete with melting, casting and rolling facilities. The plant, previously operated by the U. S. Navy, has a 366,000 square foot area.

Cold Header for Long Thin Parts

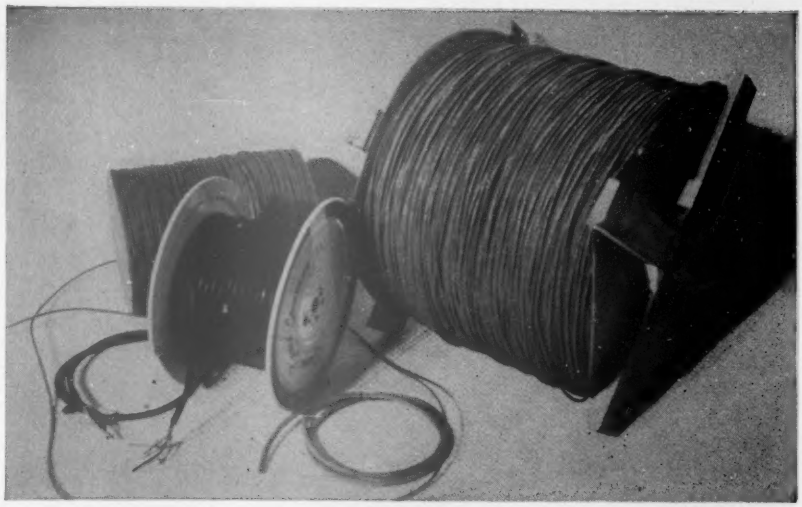
A revolutionary new Cold Heading Machine for the mass production of long thin pins, lead wires and similar parts used in the television, radio and electronic industries has just been announced by **REM Sales Inc.**, a subsidiary of the **Robert E. Morris Company.**

* * *

Known as the Morris-Omega Special "O", this new machine, the first of its kind in this country, can handle wire from .020" to .090" in diameter and produce headed parts to 2⅜" in length. Typical samples are illustrated.

* * *

This compact machine which measures only 41" x 20" x 40"



For High Tensile Strength, Specify

TEXTILENE GLASCOR*

Soft, dry fillers for portable and flexible cords, Textilene Glascor and Twi-Port have wide acceptance. Fiberglas-centered Glascor is exceptionally strong without added bulk or sacrifice of pliability. It goes into S, SJ, and SV cords with 18, 16, and 14 gauge conductors — Twi-Port into S and SJ cords with 12 gauge and larger conductors. Successful applications include control, appliance, and power cables; telephone drop wire; communications and coaxial cables.

Twitchell's superior Textilene line also includes: Fungus-resistant filler — *Twi-Tar.* Used for buried communications cable, expanded ACSR cable, and in other applications.

Moisture-resistant fillers—*Twi-Flex* and *Twi-Wax.* Used for nonmetallic sheathed cable, maritime shipboard cable, varnished cambric cable.

*Patent No. 2832190

For Every Wire and Cable Application
Twitchell's TEXTILENE Fillers Fill The Bill

Quality-controlled materials that are dependably uniform . . . in standard forms, or customized to special needs.

Assured supply from a reliable domestic source . . . always available in economical and convenient packaging.

Initial low cost with savings added by production efficiency . . . flexible, ready-to-use fillers that fit all equipment, handle and form easily, always maintain desired shape.

Proved performance as components of cables and wires that meet government specifications . . . stability shown by trouble-free installations in continuous service 20 years and longer.

FREE — SAMPLE SPOOLS of any type of Textilene filler to demonstrate the superiority of Twitchell materials in your operation — also technical counsel without cost or obligation. Just tell Twitchell your end-use requirements. *Write, wire, or phone today:*

E.W. TWITCHELL INC.

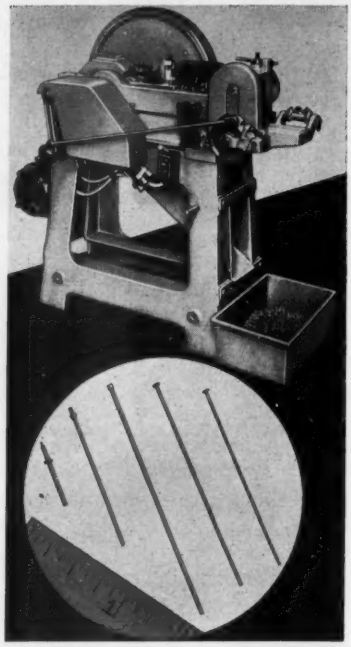
Third and Somerset Streets, Philadelphia 33, Pa. • REgent 9-7800

PAPER PRODUCTS FOR THE WIRE INDUSTRY

Twisted • Folded • Pressed • Crushed • Shaped • Braided • Woven

HAVE YOU MET THESE MEMBERS OF ALKALI IKE'S FAMILY?
ALKALI
IKE
APEX "POLY-KOTE #2" for better liquor finishes.
APEX "KLEEN-KOTE" for trouble-free multiple drafting.
APEX "WDO" DRAWING OIL for high-speed drawing of fine alloy wires.
APEX "WS-104 SPECIAL" DRAWING COMPOUND for wet drawing of bright liquor-finish fine wire, including staple wire.
APEX ALKALI PRODUCTS
Company
Lubricants & Cleaning Compounds for Wire and All Wire Products
Main and Rector Sts • Phila. 27, Pa • IV 3-3939

high is equipped with 1½ H.P. motor drive and is capable of producing a wide range of parts from 60 to 100 pieces per minute.



Standard features of this model include carefully fitted hardened steel sliding members and many critical components of solid bronze; easily accessible provision for fine adjustment of stroke, tool setting, feed and cut-off; shear pins at critical points to prevent tool damage; and one-shot lubrication system.

* * *

For complete information on this and other Morris-Omega Cold Headers write: REM Sales, Inc., The Robert E. Morris Co., West Hartford 7, Conn.

TO SELL—

Advertise in

WIRE AND WIRE PRODUCTS

IT PAYS—

Send for rates

453 MAIN ST., STAMFORD, CONN.

Outstanding Personalities of the Wire Industry

Inco Elects Vice Presidents

L. E. Grubb has been elected Vice-President-Sales and **E. M. Kline** Vice-President-Operations of the Huntington Alloy Products Division of The International Nickel Company, Inc., **Henry S. Wingate,** Chairman of the Board has announced. The election of **John A. Marsh,** as President of the Division, was announced earlier.

* * *

At the same time, **G. K. Crosby** becomes Assistant Vice-President-Administration, **J. M. Weldon,** Assistant Vice-President-Sales and **J. E. Carter,** Assistant Vice-President-Manufacturing of the Division.

Elected Officer By Cary Chemicals

Raymond H. Marks, formerly Vice President in charge of Sales for **Cary Chemicals Inc.,** has been appointed Executive Vice President. His new duties will include the coordination of all manufacturing, research and sales activities.

* * *

Cary Chemicals Inc., with plants in Flemington and East Brunswick, N. J., are manufacturers of Polyvinyl Chloride Resins and Compounds, rubber compounding ingredients and synthetic waxes. A recent expansion program has been completed by the company which will increase the present production to 50 million pounds per year.

Raymond H. Marks

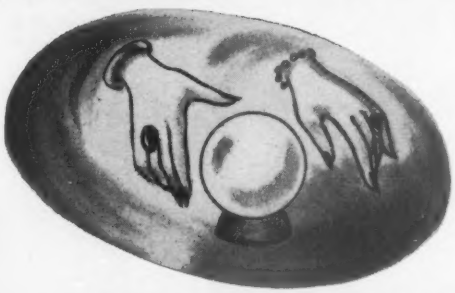
* * *

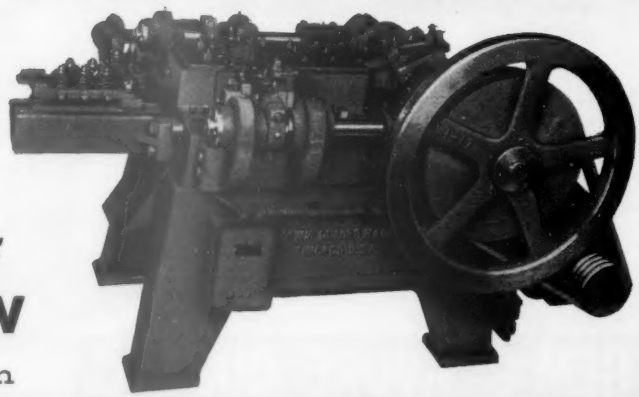
He is a graduate of North Carolina State College. Prior to joining Cary Chemicals Inc., Mr. Marks was associated with Monsanto Chemical Co., Inc., for a period of 9 years in various research, production and sales capacities and two years in the sales department of a plastic toy manufacturer.

To Handle Purchasing At Roebling's

Kinsey S. Dickel has been named purchasing agent for **John A. Roebling's Sons Division,** The Colorado Fuel and Iron Corporation, Trenton, N. J. The appointment, effective immediately, was announced by **William C. Ridge,** executive vice president. Mr.

IF THERE'S A NAIL MACHINE IN YOUR *Future* make it a GLADER





11 SIZES OF MACHINES

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Write for 12 Page Bulletin

Wm. GLADER MACHINE WORKS 210 N. RACINE AVENUE CHICAGO 7, ILLINOIS

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Dickel, in turn, appointed **Joseph G. Hottinger** to the post of assistant purchasing agent.

* * *

Mr. Dickel, formerly assistant director of purchases, is a graduate of Rider College and has been with Roebling for 33 years. Mr. Hottinger, a veteran of 43 years with the Roebling Division, was a buyer in the purchasing department. He attended Rider College and Temple and Rutgers Universities.

Lee Wilson Appoints Research Head

J. A. Bauscher has joined the **Lee Wilson Engineering Co., Inc.** as Vice-President in charge of research, it was announced recently by president **Floyd Olmstead.**

* * *

Mr. Bauscher comes to Lee Wilson from the U. S. Steel Corporation where he was Chief of the Sheet Products Division of the Applied Research Laboratory. In this capacity he directed research and product development activities on tin plate, coated sheets, enameling steels, electrical sheets, drawing-quality steels and stainless steels.

* * *

Prior to his asscociation with U. S. Steel, Mr. Bauscher undertook graduate studies at Pennsylvania State University which led to the degree of Master of Science in Metallurgy. Prior to this, he was associated with the Bohn Aluminum and Brass Corporation.

J. A. Bauscher

To Head Inco's Huntington Alloy Products Division

At a recent meeting of the Board of Directors, **John A. Marsh** was elected President of The Huntington Alloy Products Division of **The International Nickel Company.**

* * *

Mr. Marsh became associated with The International Nickel Company, Inc., as a laboratory assistant in the Huntington Works in West Virginia following his graduation from the University of Michigan with a B.S. degree in 1928. He transferred to the company's Bayonne Works in New Jersey in 1936, becoming General Superintendent of the Works, was named General Superintendent of the Huntington Works in 1942, and in 1944 was promoted to Assistant General Manager.

Marking Machines, Wheels & Inks

FOR INSULATED WIRE, TUBING AND PIPE—

Type AM — Illustrated has these features:

1. FINE VERTICAL AND HORIZONTAL ADJUSTMENTS PROVIDE PERFECT MARKING ON WIRES OF .010" TO 3.00" IN DIAMETER.
2. ACCOMMODATES FLAT, CONCAVE, OR SPECIAL WHEELS.
3. CAN BE DRIVEN BY ELECTRIC MOTOR OR SELSYN TRANSMITTER AND RECEIVER TO INSURE PERFECT PRINTING WITH MINIMUM PRESSURE.

GEM GRAVURE CO., INC.
West Hanover, Massachusetts, U. S. A.
CABLE ADDRESS: GEMGRA
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IN THE MARKING OF EXTRUDED MATERIAL THERE ARE BIG ADVANTAGES IN ONE SINGLE SOURCE OF SUPPLY.
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West Coast Representative: Paul I. Kenner Co., 230 Shaw Rd., So. San Francisco, Calif.
West Germany: Walter G. Fritzke GMBH, AM Wehrhahn 94-96, Dusseldorf, W. Germany

In 1947 he was elected Assistant to the Vice-President in General Charge of All Plant Operations of the company in the United States, was named Manager of the Operating Department in 1952, and was elected an Assistant Vice-President later in that year. He was elected Vice-President of The International Nickel Company, Inc., in 1953, and in 1958 was made Vice-President and Manager of the newly-formed Huntington Alloy Products Division.

Durant Appoints Regional Manager

W. B. Winkler, Vice President, **Durant Manufacturing Company,** Milwaukee, Wisconsin, manufacturer of industrial counters and counting instruments, has announced the appointment of **Allen B. Holmes,** as Mid-West and Southern regional manager, replacing **J. K. McGinley,** who was recently named General Sales Manager.

* * *

Mr. Holmes, who has been in an orientation program with Durant since the first of the year, assumed his managerial duties on May 1, and will be in close contact with Durant representatives in his territory.

* * *

A graduate from the University of Maine with a degree in electrical engineering, he came to Durant from 18 years' service with General Electric Company. For the past four years he had been a regional sales supervisor in that company's control products line.

Allen B. Holmes

Eisler Transformer Expands by Acquisition

Dr. Charles Eisler, Chairman of the Board of the Eisler Transformer Co., 16 N. Salem St., Dover, N. J., has acquired all the assets of the Harrison Transformer Co., of Springfield, N. J.

* * *

John Fernicola, Manager and proprietor of the Harrison firm, has been made Vice President and Manager of Operations of Eisler Transformer Co. With its added facilities, the company will manufacture power transformers up to 2500 KVA in the near future.

Firth Sterling Appointments

Robert K. Warren has become Vice President of sales, steel division, **Firth Sterling Inc.,** it was announced by **Kenneth D. Mann,** President. At the same time, **John S. Roller,** previous sales executive, is being promoted to assistant to the president.

* * *

The ALL-NEW FEDERAL

15,000 VOLT ELECTRONIC SPARK TESTER

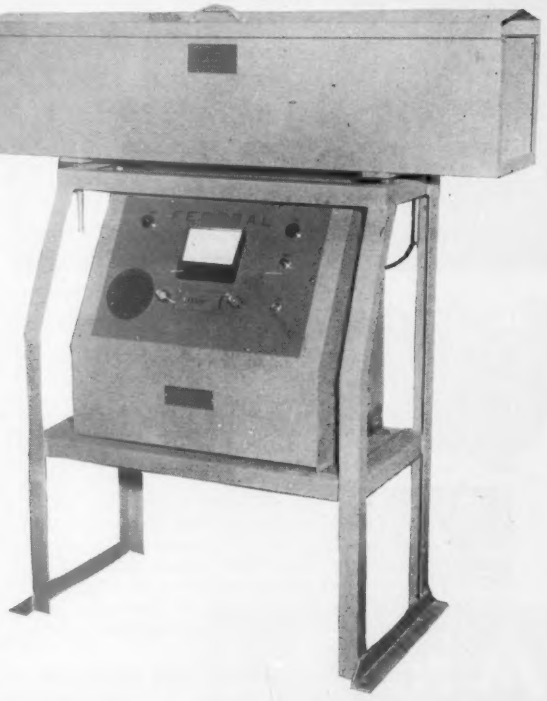
FOR ALL TYPES OF ELECTRIC WIRE AND CABLE

SPEED DETERMINED BY ELECTRODE LENGTH

Features

- CONTROLLED MA OUTPUT
- HIGH SPEED FAULT DETECTION
- HIGH SENSITIVITY

The Model CVE shown is for use with Extruding Machines
For Further Information Write Box 36

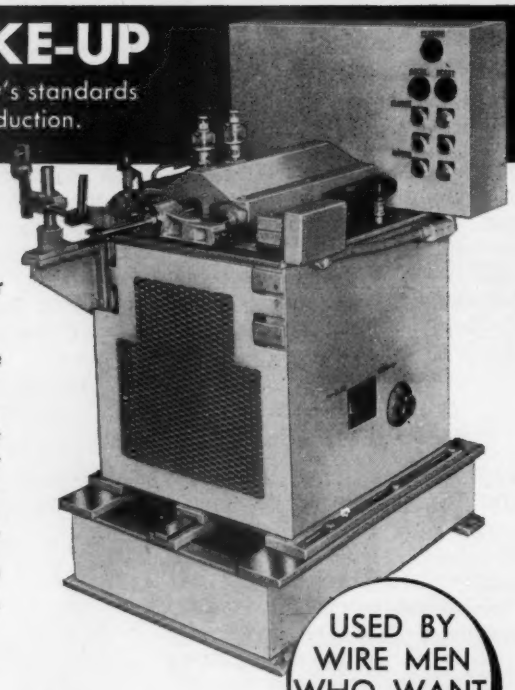


FEDERAL 15,000 Volt Model CVE
Other Models 5-10-15-30-50 K.V.

THE FEDERAL MANUFACTURING CO. WALLINGFORD, CONN.
WIRE MACHINERY • TESTING EQUIPMENT

Sjogren FLAT WIRE TAKE-UP

This new SJOGREN machine is designed to meet today's standards for trouble-free operation and long-run wire mill production.



FEATURES INCLUDE:

SPEED — Presently running 650 fpm.

CAPACITY — 25 pound maximum capacity spool. (Similar models for heavier capacity).

TRAVERSE — Hydraulic spool traverse is infinitely adjustable from zero to ⅝" per rpm of spool.

TENSION — When placed directly behind flattening mill, constant tension is maintained through a Louis-Allis eddy current clutch type motor.

STARTING — Forced acceleration circuit prevents slack wire.

BASE — Machined so that top unit may be moved to compensate for wear on the flattening mill roll.

USED BY WIRE MEN WHO WANT THE BEST!

Sjogren TOOL & MACHINE CO., INC. 14 Sword St. AUBURN, MASS.

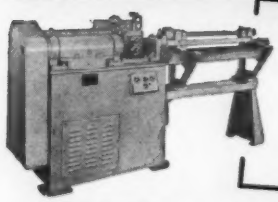
WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • GAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

new

SHUSTER 2AV

infinite, variable speed, electrically controlled,

Automatic Wire Straightening and Cutting Machine!



CAPACITY: 1/16" to 3/16" mild steel wire, 1/16" to 5/16" high tensile wire, 50 to 200 FPM.

Send for complete details on this high speed, low cost dependable SHUSTER! Ask for our quotes on your wire straightening and cutting needs for any wire sizes from .020" to 1 1/16".

SHUSTERS give you straightened and cut wire *when* you need it, at lower investment than any comparable machines. The right combination to lowered production costs is *coiled* wire plus a dependable SHUSTER. Let one of our sixty representatives (there's one near you) give you the facts. Let us show you how you can materially lower your wire production costs!

Send for free, handy, wall-size split gauge wire chart from 41 gauge to 7/0.

METTLER MACHINE TOOL, Inc.

Adeline Street, New Haven, Connecticut

A **SHUSTER**

Roll Straightener

Gives It To You

STRAIGHT!

Here's Shuster's twelve roll, central foot wire straightener that neutralizes any and all kinks, snarls, or twists in the coil — and improves production. It's shown with the well-known SHUSTER Universal Wire Reel, making a team that matches up just right with your forming machines, headers, power presses, etc. STRAIGHTENERS in six sizes for .045 to 9/16" diameter wire; also for narrow flat stock. REELS take coils to 300, or to 500 lbs.

Send us your specs for correct literature.

METTLER MACHINE TOOL, INC. Adeline St., New Haven

Mr. Warren started his career in the metallurgical department of Crucible Steel Company and served in various capacities, including chief metallurgist, plant superintendent, works manager and assistant general manager of tool steel sales. Following this he was associated successively with Hawkridge Brothers Co., Boston, and Universal Cyclops Steel Corp., Bridgeville, Pa.

Named Plant Manager

James E. Lytle has been appointed Plant Manager of the Tonawanda, N. Y., plant of the **Wickwire Spencer Steel Division** of The Colorado Fuel & Iron Corp. He succeeds **Carl J. Murray**, who has been assigned to other corporate duties in the company.

Du Mond Appointed by ASM To Two Important Posts

Allan R. Putnam, Managing Director of the **American Society for Metals**, has announced the appointment of **T. C. DuMond** as Manager, National and Regional Metal Congresses and Director of Membership and Chapter Relations.

* * *

He will provide counsel and direction for ASM headquarters and will work with national ASM committees in obtaining speakers, papers and session chairmen.

* * *

Mr. DuMond also is editor of ASM Transactions and of the society's Metals Review.

Named Metallurgist at N-S's Worcester Division

Fred Krieger has been appointed metallurgist at the Worcester Wire Division, **National-Standard Company**, according to **Carl W. Backstrom**, Worcester Division manager. Mr. Krieger had been in the metallurgical department at the Niles, Mich., plant of National-Standard.

* * *

He joined National-Standard following his graduation from Michigan State University in 1956 with a B.S. degree in metallurgy.

To Handle Production For Hitemp

Wiliam Blandy has been appointed manager of manufacturing by **Hitemp Wires, Inc.**, Westbury, L. I., N. Y., replacing William W. Crossman, who has been reassigned by the company to other duties. Mr. Blandy was previously connected with Cornish Wire Co. and Rockbestos Products Corp.

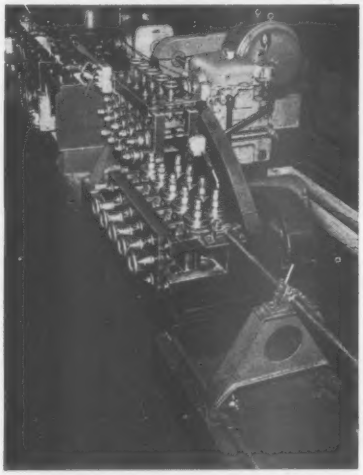
Joins Crucible Steel For Process Development

John G. Gill has been appointed Assistant Director — Process Development in **Crucible Steel Company's** Technology Department. In his new position Mr. Gill will supervise the planning, evaluation and coordination of all process technical development activities.

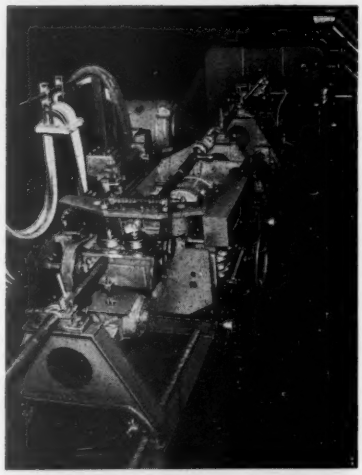
* * *

LOMATIC

COMBINED DRAWING STRAIGHTENING CUTOFF AND POLISHING MACHINE



Payoff - Drawbench - Straightener



Flying Shear - Polisher - Discharge

Now available in two standard sizes, the revolutionary LOMATIC machines handle ferrous and non-ferrous rods and tubes at speeds up to 200 ft. per min. and with drawing capacities up to 16,000 lb. Compared to conventional separate rod drawing, straightening, polishing and cutting-to-length operations, the LOMA single-operation fully automatic machine offers the following major advantages:

- Greater output rate — continuous operation at high speed
- Reduced labor cost — only one operator required
- Improved straightness — stock is straightened in two planes
- Perfect concentricity — obtained by straight-line drawing action
- Higher surface finish — due to two-stage polishing unit

The complete line comprises an uncoiler, a pre-straightener, a drawbench, a roller straightener, a flying cutoff, a polishing machine and a discharge table. All components required for the complete sequence of processing operations are interlocked mechanically and electrically into one integrated and synchronized line which is controlled by only one operator.

Our standard line of equipment includes:

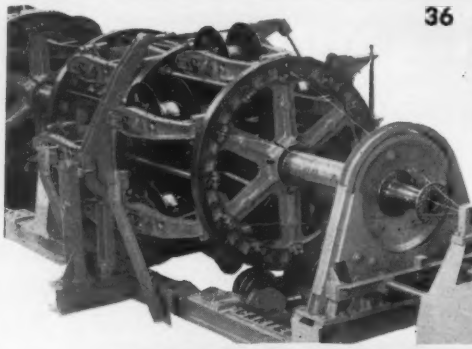
- Casting Machines and Molds
- Saws and Cut-off Machinery
- Hot and Cold Rolling Mills
- Rod and Tube Draw Benches
- Roller and Stretcher Levellers
- Air and Hydraulic Tube Testers

LOMA
MACHINE MFG. CO., INC.
114 East 32nd Street
New York 16, N. Y.

STRANDING ?

ALL TYPES OF STRANDING MACHINERY FOR ELECTRIC CABLE & WIRE ROPE INDUSTRIES — RIGID MACHINES, TUBULARS, LOCKED COIL OR HALF-LOCK MACHINES.

SEND US YOUR PROBLEMS OR ENQUIRIES.

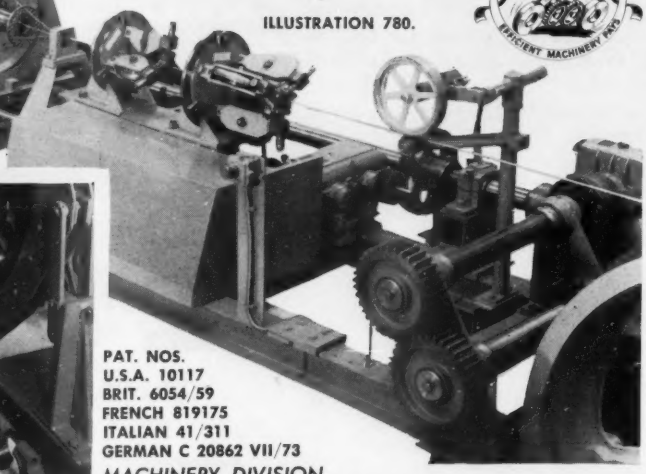


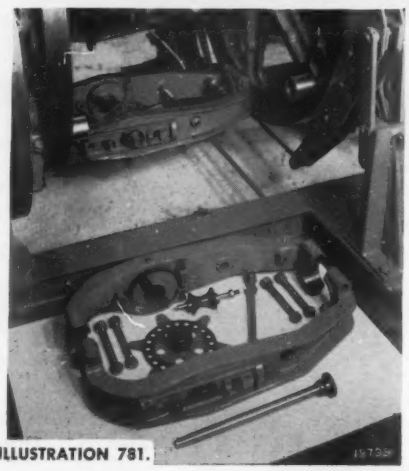
36 REEL PLANETARY STRANDING MACHINE

FOR 16" OR 405 M.M. REELS. FITTED WITH TWO COMPACTING HEADS FOR ROUND STRAND. FOR COMPACTING TO 90% OF THE ORIGINAL DIAMETER ON COPPER OR ALUMINUM.

ALSO SHOWN IN ILLUSTRATION 781 ARE THE FAMOUS "CARTER" SPLIT CRADLES FOR EASY MAINTENANCE & ASSEMBLY.

ILLUSTRATION 780.





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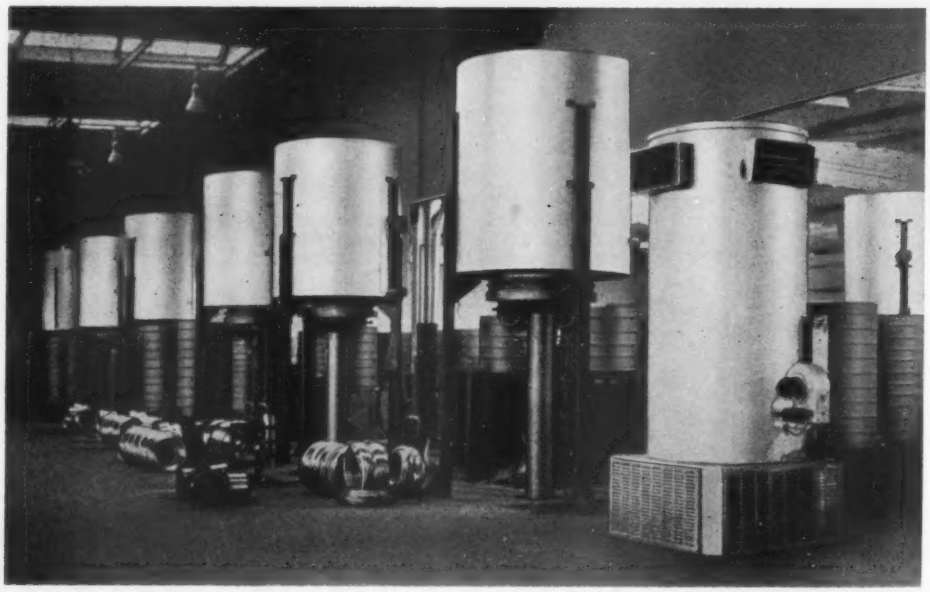
R. H. Richman, Preci-Matic Corp., 60 E 42d St., New York 17, N. Y.

THE LAST WORD IN MODERN EFFICIENT DESIGN!



SEVERAL VACUUM BRIGHT ANNEALING UNITS WHICH WE HAVE INSTALLED IN ONE OF THE MOST PROMINENT CABLE WORKS IN GERMANY

(German and Foreign Patents)

*

SOLE REPRESENTATIVE:
PAUL REICHER
Machinery & Equipment
600 Eglington Ave., East,
Toronto 12, Ont., Canada

OFENBAU **FRITZ** G. m. b. H. & Co. K. G. **HAGEN,** (W.-GERMANY)

Mr. Gill was formerly Vice President and Director with Canadian Steel Improvements, Ltd. of Toronto, Ont. Prior to this he worked for United Steel Companies, Sheffield, England, and spent four years as a Consulting Engineer in the Canadian Maritime Provinces.

* * *

Mr. Gill attended the Rotherham and Kingston Colleges of Technology, in England, where he graduated in Mechanical Engineering.

Hertzog Promoted by Roebling

Rudolf H. Hertzog has been named chief product engineer for wire and cold rolled steel products by **John A. Roebling's Sons Division,** The Colorado Fuel and Iron Corporation. The appointment was announced by **W. C. Palmer,** general product manager.

* * *

A 1933 graduate of Lehigh University with a degree in metallurgical engineering, he was employed by Roebling in 1941 as a development engineer in the research laboratory. From 1947 until his present assignment, he served as metallurgical engineer in the Roebling wire mills.

* * *

Mr. Hertzog is well known in engineering and industrial circles. He is a member of The Wire Association, The American Society for Metals, The Fine Wire Association, and, in addition to being the Roebling representative on the national activities of the American Society for Testing Materials, is a member of ASTM's Philadelphia district council.

Rudolph H. Hertzog

Blane Appoints Technical Director

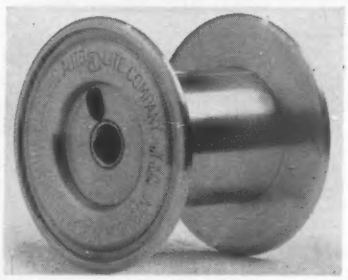
The Blane Corporation, Canton, Mass., manufacturers of vinyl and polyethylene compounds and color concentrates, announces the appointment of **Sumner H. Levin** as Technical Director. In this position, he will direct research and development on new and improved vinyl insulations.

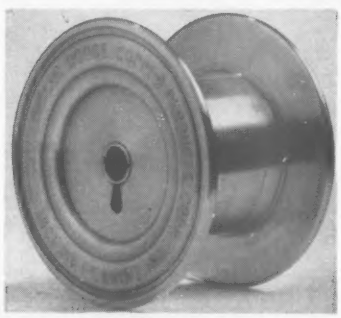
* * *

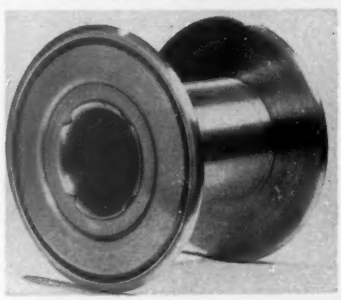
Mr. Levin has been associated with The Blane Corporation since 1958. Prior to this, he was employed as a Rubber and Plastics Chemist by the Plymouth Rubber Company, Canton, Mass. He is a graduate of Clark University (B.S. Chemistry) 1942.

DESIGNED FOR CUSTOMER APPEAL:

HUBBARD ALUMINUM SPOOLS







NEW FEATURES

1. STRONGER ALUMINUM HEAD — NO WEIGHT INCREASE
2. WELDED CONSTRUCTION — NO OPENING AT HEAD AND BARREL
3. SMOOTH SURFACES — NO SNAGS, REDUCES WIRE SCRAP LOSS
4. UNIFORM TARE WEIGHT — IDEAL FOR BULK WEIGHING

Telephone: GARRETT 840

HUBBARD SPOOL DIVISION
The American Pulley Company

GARRETT, INDIANA

A Review of Recent Wire Patents

The data listed below is only a brief review of recent patents pertinent to the readers and subscribers of this publication.

Complete copies of these patents may be obtained by writing to the publisher of this magazine and remitting 50c for each copy desired. For orders received from outside the United States the cost will be $1.00 per copy.

No. 2,931,496, PRESS FOR SHEATHING CABLES, patented April 5, 1960 by Walter Haendeler, Dusseldorf, Germany, assignor to Schloemann Aktiengesselschaft, Dusseldorf, Germany.

More specifically the sheathing is of aluminum and the cables, of course, of insulated electric wires. The press is said to operate to overcome the tendency of the insulatoin of such cables to be damaged by the extrusion temperature.

* * *

No. 2,931,530, COIL HANDLING DEVICES, patented April 5, 1960 by Alfred Erwin Reginald Arnot, Basingstoke, England, assignor to Emmanuel Kaye and John Reginald Sharp, Basingstoke, England.

The device includes a gripping assembly comprising a number of shoes standing out from a body and adapted to enter a coil, including a pivotable, non-traversable shoe having two oppositely-facing gripping faces and an eccentric pivot between these faces, and a traversable shoe movable bodily toward and away from the non-traversable shoe to effect a gripping action on the coil.

* * *

No. 2,931,533, WIRE DISTRIBUTING APPARATUS, patented April 5, 1960 by Joseph W. Wiesmann, Pittsburgh, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa., a corporation of Pennsylvania.

Specifically, this patent is directed to a wire-distributing cellular metal floor.

* * *

No. 2,932,687, COAXIAL CONDUCTOR CABLE, patented April 12, 1960 by John Brown Cook, North Haven, Conn., assignor to The Whitney Blake Company, Hamden, Conn., a corporation of Connecticut.

The two wire conductors are insulation-sheathed and the sheathing spaced one from the other, with connections at top and bottom to tapes, integral with the insulation.

* * *

REISSUE No. 24,813, ELECTROMAGNETIC DELAY CABLE, patented April 19, 1960 by Henry G. Nordlin, Livingston, N. J., assignor to International Telephone and Telegraph Corporation, Nutley, N. J., a corporation of Maryland.

About the paramagnetic ferrite is a helically wound tape with the turns spaced apart, a number of discrete capacitive units bonded to the tape in spaced relation along the helically wound tape to provide a predetermined phase compensation over a given frequency band, and a coil of insulated wire wound on the core in overlying relation to the units.

* * *

No. 2,933,424, METHOD OF MAKING COLD HEADED WIRE, patented April 19, 1960 by Charles G. Canney, Holden, and Francis P. Whalen, Shrewsbury, Mass., assignors to United States Steel Corporation, a corporation of New Jersey.

The method of making cold heading wire is disclosed and comprises providing a hot rolled round rod made from steel containing .05 to .42% carbon, 1.50% maximum manganese, .05% maximum sulphur, .04% maximum phosphorus, 2.00% maximum nickel, 2.00% maximum chromium and .50% maximum molybdenum, and the remaining substantially all iron, drawing the rod to reduce its area between approximately 15 and 90%, then spheroidizing the wire, drawing the spheroidized wire to reduce its area between approximately 5 and 15% to finished size, then heating the wire throughout to a temperature of between approximately 950 and 1150° F., cooling the wire to room temperature, and then cold heading it.

* * *

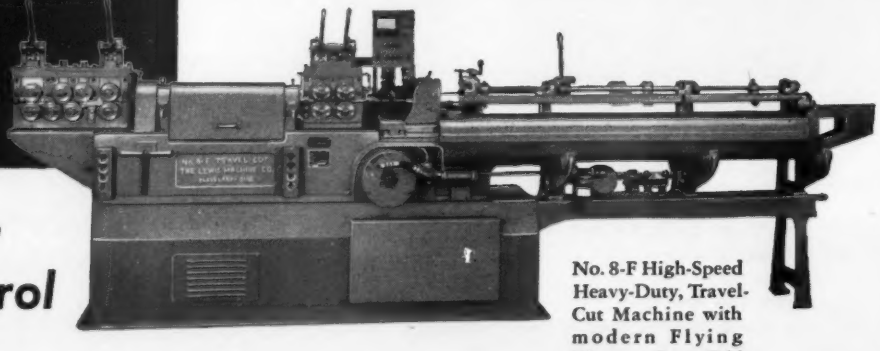
No. 2,933,733, MACHINE FOR SECURING WIRE FASTENERS TO BOXES, patented April 26, 1960 by Edward A. Strollis, Webster, N. Y., assignor to Kemp Equipment Company, Rochester, N. Y., a corporation of New York.

There are thirteen claims to this patent which includes a die and former

WIRE STRAIGHTENING AND CUTTING with Air Clutch and Air Brake

for better quality control

• Greater accuracy with a minimum of spot swell is achieved through three important improvements on the famous Lewis Travel-Cut Wire Straightening and Cutting Machines . . . Wichita Air Clutch and Brake and Reeves Variable Speed Drive. There are 34 models in the Lewis line from .012" to ¾" rounds and shapes at speeds up to 200 FPM. Write for new brochure.



No. 8-F High-Speed Heavy-Duty, Travel-Cut Machine with modern Flying Shear Cut-Off Mechanism. Handles 5/32" to 3/8" dia. wire at speeds up to 200 FPM.

THE LEWIS MACHINE COMPANY

3441 EAST 76TH STREET • CLEVELAND 27, OHIO

to shape a length of wire into a staple, then moving a plunger forward to force the staple into the article, then moving the former out of alignment with the die, and for then retractnig the plunger and slide.

* * *

No. 2,933,804, ELECTRICAL WIRE RESISTORS AND METHOD OF MANUFACTURING THE SAME, patented April 26, 1960 by Fritz Math, Wiesbaden, Germany.

The single claim is directed to the method which comprises preparing a strip of mesh composed of a continuous weft wire made of metal having electric resistance characteristics and a relatively high melting point, and of warp strands made of metal and adapted to be oxidized at a temperature below the melting point; embedding this strip of mesh in a heat-resistant dielectric substance; and heating the strip to a temperature sufficient to burn the warp strands, so that, after burning them, an electric wire resistor remains consisting of the continuous weft wire embedded in a dielectric substance.

* * *

No. 2,934,100, DEVICE FOR FORMING LOOPS ON WIRE, patented April 26, 1960 by Henry J .Huber, and Karl E. Korn, Trenton, N. J., assignors to United States Research Corporation, a corporation of New Jersey.

This is a two jaw hand tool for forming wire loops.

* * *

No. 2,934,280, COIL WINDING MACHINE, patented April 26, 1960 by Lowell M. Mason, Fort Wayne, Ind., assignor to General Electric Company, a corporation of New York.

A rotatably longitudinally movable member having a section arranged to feed wire into the core of a dynamoelectric machine is provided, together with a motion transmitting member having a first portion secured to the movable member and a second portion movably attached to a radially extending member for rotation therewith and for radial movement toward and away from the axis of rotation of rotary driving means in response to the movement of a cam follower in a track, thereby producing a controlled longitudinal and rotational movement of the movable member.

* * *

No. 2,934,281, DEVICE FOR RAPIDLY UNWINDING EXCESS WIRE STORAGE, patented April 26, 1960 by Edward J. King, Jr., Leawood, Kans., assignor, by mesne assignments, to Collins Radio Company, Cedar Rapids, Iowa, a corporation of Iowa.

More specifically, this patent relates to a toroidal coil winding machine of the type comprising a ring bobbin having an axis perpendicular thereto, this ring bobbin carrying on its circumference wire to be wound on a toroid, a device mounting the bobbin, this device driving the bobbin in rotation about the bobbin axis for unwinding the wire carried by the bobbin; a device for rapidly unwinding excess wire from the ring bobbin comprising a positionable finger, mounting means for disposing the finger between the bobbin axis and the circumference of the bobbin, this finger means normally withdrawn from the plane of the bobbin and a finger positioning device for selectively moving the finger into the plane of the bobbin.

Designing Parts for Cold & Hot Heading

The Industrial Fasteners Institute, 1517 Terminal Tower, Cleveland 13, Ohio, has published a new "how-to" manual entitled "Designing Parts for Cold and Hot Heading."

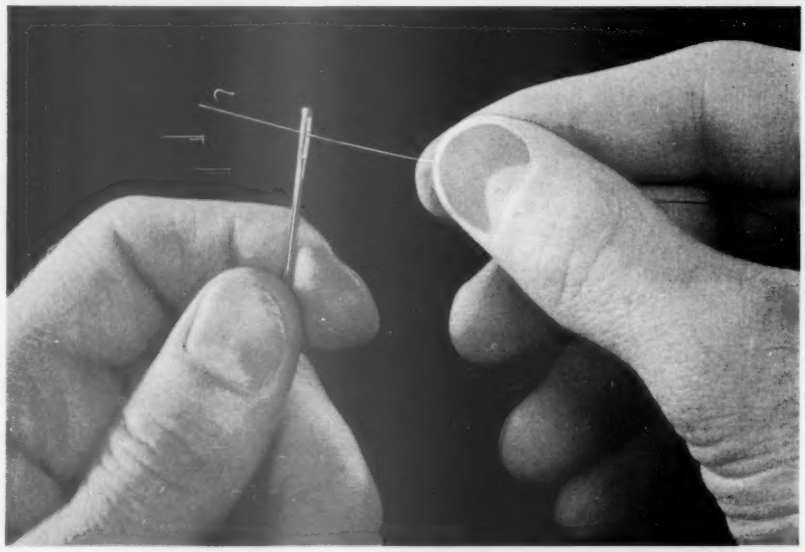
* * *

It is particularly edited for anyone connected with designing, specifying or purchasing small metal parts, such as fasteners, headed or collared pins, etc., that may be made by cold or hot heading processes. The text covers design principles, materials, production methods and factual data on methods employed and results achieved in a wide variety of successful cases. It is profusely illustrated.

* * *

The manual is 7" x 10¼" in size, bound in hard covers, has 95 pages of text, and sells for $2.00. It may be ordered from the Institute, but the sale of this first edition is limited to the North American continent.

METAL ALLOY WIRES:
Tailor-made for Specific Purposes



Precision Drawn **Single Strand** Wires

THESE BASIC ADVANTAGES ARE BIG ONES:—

- Closer in tolerances than most commercial wires
- Make important savings in finished products possible
- Tailor-made with special characteristics to meet specific functional needs

Drawing specialty wires to consistent hairline caliper with specific characteristics of strength, elasticity, hardness, resiliency or what have you . . . demands exacting *die control* through all production phases. When applied to specific requirements, these "Specials" also require extensive know-how experience and advanced production facilities.

As a leading producer of finest quality paper mill wire cloth, woven mesh and drawn single strands, our production team of metalurgists, engineers and technicians can help you select the right wires for any application and deliver them "on schedule."

WISCONSIN WIRE WORKS
APPLETON · WISCONSIN

Alloy Metal Shortens Delivery Dates

The delivery schedule on stainless steel and nickel alloy fine wire has been drastically stepped up by **Alloy Metal Wire Works,** Riverside-Alloy Metal Division, H. K. Porter Co. In many cases, the plant has been able to offer complete delivery in 10 days.

* * *

Some alloys, especially in the "as drawn" condition, can be shipped within one to two weeks. Annealed wire has been made available with 10 days to three weeks delivery, depending upon quantity.

* * *

Riverside-Alloy produces most types of stainless steel and virtually all INCO Nickel Alloys in fine wire sizes. These sizes range from .0035" to .023". Much of this material has been used for knitting, braiding, weaving and stranding.

* * *

Filters and screens for a variety of industrial applications are produced from fine wire of this sort. They have performed an endless list of tasks in an equally endless list of products.

* * *

Alloy Metal Wire Works, known by many as a fine wire specialty mill, has been producing these finer wire sizes since the plant was established 40 years ago.

Manufacture of Sectorised Power Cables

The difficult problem of accurately controlling the wall thickness of insulation extruded over sectorised conductors has been solved by the improved Capacitance Controller manufactured by the **Addison Electric Company Limited.**

* * *

Owing to the irregular shape and preformed twist of sectorised conductors used in power cables, it has been exceedingly difficult, in the past, to ensure consistent minimum coating thickness of the extruded plastic insulant. It has

Addison Capacitance Monitoring & Control Equipment: System K * * * * * *

generally been the practice, therefore, to cut occasional rings of the insulation and examine these by means of a hand micrometer for wall thickness; subsequently making the necessary adjustments to the manufacturing process in order to correct size errors.

* * *

The Addison Capacitance Monitoring and Controlling Equipment allows these measurements to be made continuously and non-destructively. The manufacturing pro-

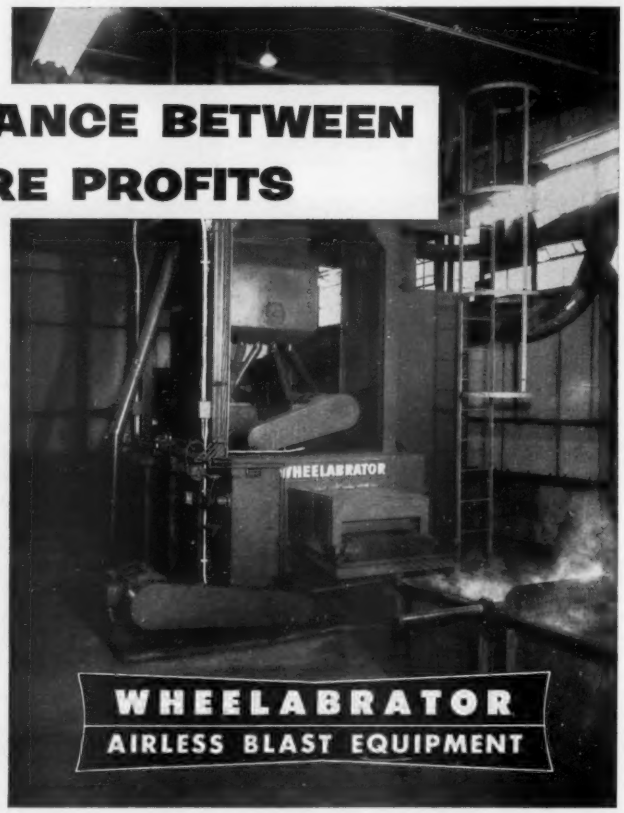
EXECUTIVE REPORT #25

THE SHORTEST DISTANCE BETWEEN STEEL ROD AND WIRE PROFITS

Wheelabrator® Straight-Line Cleaning, Patenting, Coating

At Leschen Wire Rope Division of H. K. Porter Co., Inc., 12 strands of hot-rolled rod go simultaneously through patenting, cleaning and coating in one continuous operation. Wheelabrator mechanical blast descaling is the essential step that makes this efficient processing possible. The blast descaling process eliminates the problems associated with acid pickling, and makes additional savings in time and labor costs.

This efficient production line operates continuously for 24 hours a day, 5 days a week without down time. Investigate the benefits you can realize with this new process for cleaning any type of ferrous or non-ferrous hot rolled rod and bar stock for cold drawn products. Write to Wheelabrator Corp., 389 S. Byrkit St., Mishawaka. Ind. In Canada, P. O. Box 490, Scarborough, Ont.



cess is controlled automatically to maintain minimum average wall thickness and the results may be recorded on a strip chart recorder, if required. The equipment consists of a special electrode structure, incorporating a guard circuit to eliminate stray fields. This serves to measure the average capacitance of the insulation with respect to the inner conductor over a defined length, without making direct contact with the coated conductor; the capacitance being directly related to average wall thickness. The associated instrument console contains an indicator unit incorporating adjustable 'plus' and 'minus' tolerance selectors, the automatic control unit and a strip chart recorder unit, when required. The control unit actuates a small servomotor which in turn adjusts the take-up or extruder screw speeds in such a way as to maintain constant a pre-selected value of wall thickness.

* * *

For full details, write **Muirhead Instruments, Inc.**, 441 Lexington Ave., New York 17, N. Y.

New Abrasion Resisting Tape for Wire

A new wrapping tape known as "Rulon Abrasion Barrier" is now being offered by **Dixon Corporation** of Bristol, R. I. for TFE insulated wires rated for 500°F and higher. This tape, a skived form of Rulon (reinforced TFE resin), is available in thicknesses from 0.004 inch up and widths from ¼" to 12".

* * *

Large ACSR Cable

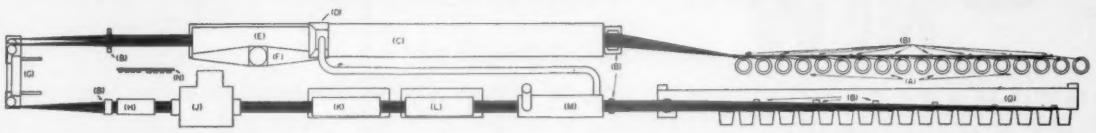
Rulon Abrasion Barrier is currently being used on missile electrical wire where it is providing abrasion resistance well in excess of specifications. The tape is recommended where extra abrasion resistance is required without increase in specified wire diameters. Best results are obtained with a Teflon primary insulation, the Rulon tape on top of primary, and an outer layer of braided fiberglass impregnated with Teflon. A #20 gauge wire constructed as above to a finished O.D. of 0.091" provides a minimum of 36" abrasion resistance when tested according to MIL-T-5438. After heat aging 96 hours at 750°F, the abrasion resistance increased by 20% and the dielectric strength by 1200 volts. The tape also appears to increase flame resistance and decrease the evaporation of primary insulation.

* * *

For engineering information, write Dixon Corporation, Bristol, R. I.

EXECUTIVE REPORT #26

WHEELABRATOR® TAKES THE KINKS OUT OF WIRE MANUFACTURING



A. PAY-OFF SWIFTS
B. ROD GUIDES
C. FURNACE
D. COLLECTING HOOD
E. LEAD BATH
F. EXHAUST HOOD
G. TURN AROUND
H. WATER COOLING BATH
J. WHEELABRATOR MACHINE
K. BORAX COATING BATH
L. LIME COATING BATH
M. DRYER
N. CONTROL PANEL
O. TAKE-UP FRAME

One of the newest and most modern wire products manufacturing plants in operation is that of John A. Roebling's Sons Corp. Here, 18 strands of steel wire pass simultaneously through the muffle furnace, load quenching bath, Wheelabrator mechanical blast cleaning machine, coating baths, drying ovens, and recoil spools on the take-up frame. All this, in an area only 250 ft. long by 30 ft. wide. Production rate is about 6,000 lbs. per hour. Wheelabrator airless blast cleaning makes this efficient, "straight-line" production possible, minimizes handling costs, solves the acid-disposal and equipment-maintenance problems.

SEE HOW OTHERS have saved with Wheelabrator automated production methods. For Bulletin 148-D write to Wheelabrator Corp., 389 S. Byrkit St., Mishawaka, Ind. In Canada, P. O. Box 490, Scarborough, Ont.

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

NEMA's New Standards Guide

The 1960 Guide to NEMA Standards Publications has been published and now is available from the **National Electrical Manufacturers Association,** 155 East 44th St., New York 17, N. Y.

* * *

The latest 18-page booklet contains descriptions of all existing NEMA Standards Publications which cover a wide range of electrical manufacturing equipment. Included are brief descriptions of twenty new books produced last year. Titles of some of these publications, all of which deal with equipment never before covered by NEMA Standards.

American Brass to Have Research Center

Richard M. Stewart, president of **The American Brass Company,** Waterbury, Conn., announced plans for the construction of a $1,500,000 research center. Ground will be broken in early summer and completion is scheduled for 1961.

* * *

The Brass Company's new research center will include metallurgical corrosion and chemical laboratories, and equipment for experimental production of new products as well as offices for the company's central technical staff.

Hatfield Installing Copper Rod Mill

Continental Copper & Steel Industries, Inc., will extend its manufacturing operations a step further with the installation of a copper rod rolling mill for its **Hatfield Wire & Cable Division.** The new facility at Linden, N. J., being installed under contract with the **Loewy-Hydropress Division** of Baldwin - Lima - Hamilton Corp., will reduce wire bar to rod for subsequent drawing to various sizes in already existing Hatfield facilities.

* * *

The rod mill will be adjacent to Hatfield's other new plant which will be devoted exclusively to the production of rubber insulated wire and cable. They both are part of CCS'S $10,000,000 Hatfield expansion and modernization program at Linden and at Hatfield's other facilities in Hillside and Union, N. J.

* * *

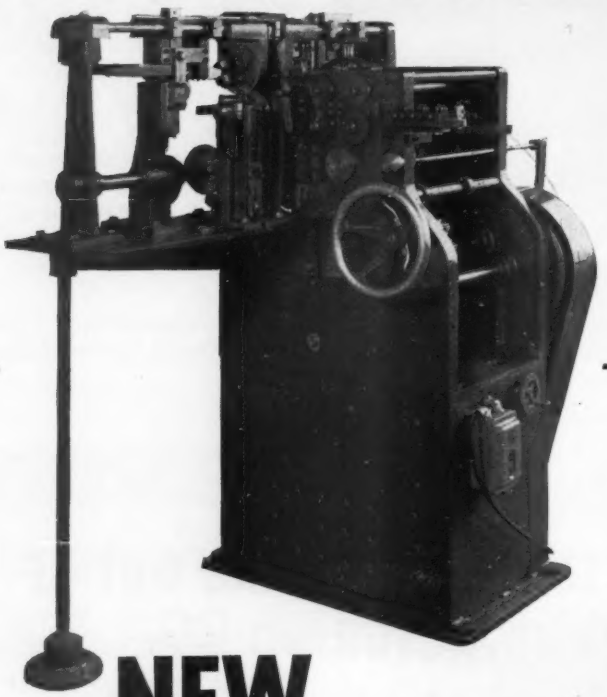
The installation will consist of a fully mechanized 24" hot breakdown mill, three 12" and six 10" continuous stands. Standard wire bars will be reduced to 5/16" diameter rod at the rate of 16 tons per hour.

* * *

The Loewy design provides not only for rolling standard bar but also for working from continuously cast billets of electrolytic copper. The plant will also have a pickling installation and storage facilities. It is scheduled to be in production by late 1960.

New Low-Shrinkage Teflon Tape for Wire

A new development in Teflon



NEW For Springmakers

AUTOMATIC COILER and LOOPER

WELLS' NEW FULLY AUTOMATIC SPRING COILING AND LOOPING MACHINE coils, trims and loops in sequence. By trimming before looping extremely accurate springs are made. Produces cross-over, machine and side loops, or any combination of these.

Machine shown above handles .025" to .062" diameter wire, forming coils of 3/16" o.d. to 5/8" o.d., 1/2" to 5" long.

Loops on each end can be varied 360° to each other and held to ±3°. Loop openings can be held to ±.010", or less.

Adapted from the WELLS large diameter automatic coiling and looping machines made for several years, this new spring machine will be a boom to manufacturers of mechanical coil springs.

Made By The Producers of the Wells Straightening And Cutting Machines.

Write for information

Frank L. Wells Company

BUILDERS OF FINE WIREWORKING MACHINERY

5821 FIFTH AVENUE • KENOSHA, WISCONSIN

OR — HARVEY SPRING MFG. CO. — 671 N. Sangamon St., Chicago, Ill.

(TFE resin) tape is a regular skived tape with controlled low-shrinkage which is now available from the **Dixon Corporation.** "Low-Shrinkage" Tape is specified to show no more than 2% change in any dimension when heated free at 730°F. for 15 minutes. This improved Teflon tape is of importance to wire manufacturers requiring insulating materials capable of withstanding prolonged exposure to high temperatures without cracking or splitting—problems common to tapes with large or variable shrinkage characteristics. These tapes are supplied in thicknesses of from 1 mil up, with widths of from ¼" to 12".

* * *

For complete details, write Dixon Corporation, Bristol, R. I.

Bulletin on Line of Chains and Sprockets

The most extensive line of roller chain and Taper-Lock sprockets ever offered by **Dodge Manufacturing Corporation,** Mishawaka, Ind., is presented in a new 56-page bulletin.

Nearly all roller chain requirements can now be met with the expanded line, which includes single strand, double strand, single strand heavy series, double pitch drive, double pitch conveyor, double pitch conveyor with large rollers, and standard attachments.

* * *

Complete with selection data and list prices, the bulletin also includes general information on the installation of roller chain drives, calculation of center distances, horsepower ratings, conveyor engineering, and instructions for lubrication and maintenance.

* * *

Ask for Bulletin A691, Dodge Manufacturing Corporation, Mishawaka, Indiana.

New Electric Wire Firm

Two men experienced in the fields of thermocouple wire and custom fabricated cable have announced the opening of plant headquarters and offices of **Champion Wire and Cable Co.** at 165 Central Ave., Rochelle Park, N. J. The principals are **William D. Morris** and **Herbert Geier.**

* * *

Mr. Morris, whose experience includes seven years as a wire mill manager and sales engineer, said Champion Wire and Cable was formed primarily to fill the need in industry for a manufacturer of short-run custom fabricated wire and cable, that affords savings that may be critical in aircraft and space vehicles.

* * *

Champion is equipped to fabricate short-run constructions as small as 25 feet using planetary cabling equipment of its own design and fabrication. In addition to cabling, C.W.C. has facilities for applying standard thermoplastics, fiberglas and cotton braids and asbestos insulation. Metallic shielding may be had over all insulations.

* * *

The engineering and production departments have complete facili-

Announcing a New Davis Electric

MASTER CONTROL CENTER

TEMPERATURE CONTROLS FOR EXTRUDERS WITH SYNCHRONIZED DRIVE SYSTEMS

Designed and Engineered with the following advantages:

- COMPLETE PANEL PREWIRED
- INSTALLED ADJACENT TO EXTRUDER — ABOVE WATER TROUGH
- CONVENIENT FOR THE OPERATOR
- USED WITH ANY TYPE HEAT CONTROLLER, ANY TYPE DRIVE SYSTEM, OR ANY TYPE OF EXTRUDER
- SAVES SPACE
- SAVES MAN POWER
- SAVES INSULATING MATERIALS AND COPPER
- SAVES YOU MONEY

Specify The DAVIS ELECTRIC Master Control System on your existing or next installation.

DAVIS ELECTRIC CO.
WALLINGFORD, CONNECTICUT
DAVIS WIRE & CABLE EQUIPMENT
DUAL and SINGLE TAKE-UPS • PAY-OFFS • CAPSTANS
SPARK TESTERS • RE-SPOOLERS
RAM-TYPE TEFLON EXTRUDERS

Another Davis First!

WRITE FOR FULL DETAILS

EVG COVERS THE WHOLE FIELD OF WELDED WIRE FABRIC

1. *Heavy Duty* model G 6—designed to handle the heaviest meshes in use, i.e. pipe mesh.

2. *Standard Duty*—handles all constructions specified by engineers for reinforcing road fabrics.

3. *Medium Duty*—a specialized machine for the low-cost production of building mesh and similar fabrics.

4. *Light Wire* machine—a high precision welder, specifically designed for the production of visual type fabrics; fencing, mink batteries, etc.

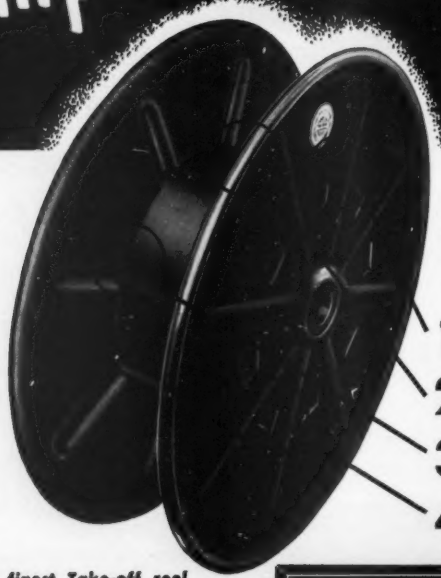
5. *Fine Wire* machine—an extra high speed, flexible changeover welder. Particularly suited to the production of welded hardware cloth in all gauges and spacings.

COMPLETE LINE OF FULLY AUTOMATIC WELDING EQUIPMENT

Please direct inquiries to: **Richard E. Kleinhans** U.S.-Canadian Representative
122 East 42nd St., New York 17, N. Y.
OXford 7-0770

Important DIFFERENCES

BETWEEN JUST ANY REEL AND *All Welded* MPS



TAKE-OFF REELS

Three important differences that mean longer reel life in both processing and handling of all types of insulated wires in your plant.

1. New MPS **deep wide, straight type embossed radial rib** adds considerable strength to reel heads over the old style narrow tapered rib.
2. **Increased height of the curled edge** adds even more strength and rigidity, especially to the rims.
3. Furnished with **rib fillers** that are projections on the end of the barrels that fit into the embossed radial ribs thereby **eliminating any marking of the plastic or rubber insulated wires** at the junction of head-barrel.
4. Finally, the **all welded "J" type construction** of the entire reel completes the picture.

The finest Take-off reel you can buy.
We invite your inquiries — let us tell you more about MPS Take-off Reels. Write us today.

Mossberg PRESSED STEEL *Corporation*

"Division of Wanskuck Co."
18 West Street — Attleboro
Telephone Attleboro 1-0848
Massachusetts U.S.A.
#109

ties for fabrication of first class cables from the drawing of the bare wire to the final inspection.

New Wire Preheater Announced

Walco Electric Co., 131 Blackstone St., Providence, R. I., has been granted a patent on an electric wire preheating machine for use in the insulated wire industry for continuously heating in straight line extrusion coating of wire.

* * *

This unit supersedes older methods of preheating the conductor wire by gas flame or oven before entering the extrusion machine. It provides uniform heat by temperature control at any given speed, safety of operation, and simplicity of control.

* * *

The machines are presently assembled in 3 sizes depending upon the sizes of bare copper wire and speed of extrusion.

* * *

Other resistant type units for other applications, such as annealing copper, steel and aluminum, before entering the drawing blocks also will be available shortly.

* * *

A leaflet describing the Walco Model W-Z preheater is available on request to the manufacturer.

New Centerless Bar Turning Machine Announced

Straus-Artys Corp, 45 No. Station Plaza, Great Neck, N. Y., are pleased to announce that the all-new Kieserling Centerless Bar Turning Machines Model WDH,

developed to reduce manufacturers rising operating costs, are now available in the U.S.A.

These machines will remove the skin of the metal and turn a black bar into a bright bar of finished size, or prepare stock for economical machining in subsequent automatic equipment.

* * *

Carbide tipped tools are used on these machines for high speed operation. They are unlimited in their use and the most difficult metals can be machined.

* * *

WDH machines can be fitted with an automatic loading and discharging device and also arranged to work automatically in conjunction with a straightening and polishing machine. When so arranged, one operator only is necessary to operate the whole plant.

* * *

It is also possible to supply the Model WDH as a special machine to take stock in coil form so that with additional auxiliary equipment it can then be taken directly from the coil, straightened, turned and cut or re-coiled.

The PESCHEL line

ELECTRICAL TEST EQUIPMENT FOR THE Wire Industry

Low Cost-High Quality Sparker

Now- GUARANTEED FOR 5 YEARS

Model S14CV — AC/DC

FEATURES: RUGGED CONSTRUCTION WITH LONG LIFE SELENIUM RECTIFIERS • ACCURATE AT ANY SPEED • DC OR AC OUTPUT • FOR USE ON EXTRUDER OR RESPOOLER. ANY SPEED • 400 FPM WITH 1" ELECTRODE (2400 FPM WITH 6" ELECTRODE) • RELIABLE OPERATION DOWN TO 5% OF MAXIMUM OUTPUT VOLTAGE • SIMPLE TO OPERATE BY INEXPERIENCED PERSONNEL.

FOR BEST VALUE — SPECIFY PESCHEL SPARKERS

PE PESCHEL ELECTRONICS, INC.

TOWNERS, NEW YORK (Putnam County) Tel: TRinity 8-3251

Detailed literature and full information on this equipment is available on request.

New Modular, Portable Strip Coil Racks

A new series of Strip Coil Racks has recently been announced by **Jarke Manufacturing Company,** manufacturers of modular storage systems and materials handling equipment.

* * *

The new racks are available in four standard size units for coils from 24″ to 42″ diameters with a capacity of up to 6000 lbs. Special units of unlimited capacities may also be designed for particular requirements. Made of heavy gauge formed channel with square tubular steel corner posts, each capped with positive locking nesting plugs for safe stacking. Open construction permits easy access to coils, and simplifies inventory control. 3″ under-clearance permits forklift entry from all 4 sides. Partial load retainers may be obtained to keep coils upright in partially loaded racks. The new racks can be supplied with special welded crane bails and braces to permit lifting, transport and stacking by overhead crane. To further facilitate the handling of strip coils, Jarke also offers light and heavy-duty "C" Hooks that enter into coil-opening for easy movement with overhead crane.

* * *

For complete details and prices write Jarke Manufacturing Company, 6333 Howard St., Chicago 48, Ill.

Textile Machine Works Shows Diversification of Operations In Open House In May

Textile Machine Works, Reading, Pa., well and widely known since 1902 as a major source of textile machinery, has been undergoing a diversification of its operations in the last five years to a point where its newest division, the

Birds Eye View of TMW's Buildings.

Contract Department, has become one of its most important ones.

* * *

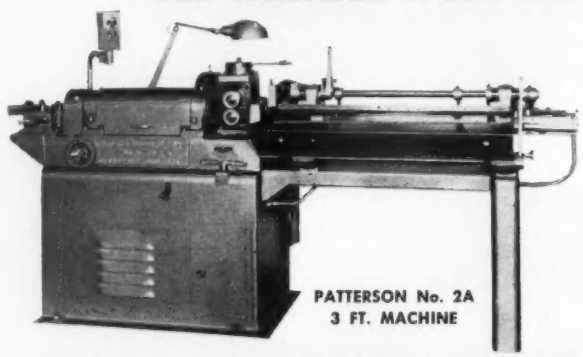
While it in no way minimizes the older activities of producing knitting and braiding machines, needles in great variety, etc., the new department, because of the vast production facilities that occupy over a million square feet of floor space, has become a major producer of parts for missiles, aircraft and ordnance, besides serving a great variety of industrial concerns, among them a number of wire companies.

* * *

Facilities embrace the necessary engineering and design personnel for special machinery and the production equipment to supply the finished item. Such widely diversified products as the Bachman fully automatic pretzel making machine, a Columbia revolver type stud setting machine, parts for IBM computers, an automatic paint

GEO. C. PATTERSON
HI-SPEED
AUTOMATIC WIRE STRAIGHTENING & CUT-OFF MACHINES

ELECTRICALLY OPERATED
with VARIABLE SPEED DRIVE



PATTERSON No. 2A
3 FT. MACHINE

We are proud to present this machine & 35 additional models to the mills and fabricators of wire, for we honestly believe they are top value in their field today. We have spared no expense to give you a precision machine tool that will give years of uninterrupted service. All iron castings are close grained Meehanite iron; cut-off and opener levers are high grade steel castings; all guides are hardened tool steel; electrical equipment is wired ready to run.

- MINIMUM COST
- MAXIMUM PRODUCTION
- ACCURATE LENGTHS
- NEW FEATURES

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The GEO. C. PATTERSON Machine Company

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PHONE: BRoadway 1-1808

color mixer for du Pont, drilling and boring machines for Bedford, and parts for Harrington and Richardson M-14 rifles are made for TMW customers.

* * *

A separate Wire Product Division produces millions of specialized needles for knitting machines, surgical needles, hypodermic needles and numerous types of linkages and parts for the textile industry.

Wire Company Adds Strand Furnace

As a part of the third stage of their current expansion program, **Branford Machine and Manufacturing Co.,** North Haven, Conn., has installed a 20-tube strand annealing furnace for stainless steel wire.

* * *

George E. Seeley, Vice President, stated that the furnace is equipped with the latest temperature controls, enabling the holding of temperatures within such close limits that they now are able to supply stainless wire in any predetermined condition — dead soft, one-quarter hard, etc., as desired by customers.

Wire Plant in New Quarters

Earl R. Potter, President and General Manager of **Industrial Wire Products Corporation,** has announced that his company has completed the moving of the equipment and offices to 2417 E. 23rd St., Los Angeles 58, Cal.

* * *

The new facilities are quartered in the building formerly occupied by the **K. H. Davis Wire & Cable Corp.,** which itself recently moved to another location in the city. Certain of the equipment of the Davis firm was also purchased, enabling Industrial Wire Products to supply products made by them from raw material to the finished items. The firm makes wire, wire cloth, screening and wire products.

* * *

Mr. Potter, a director of The Wire Association, is a member of the Program Committee that will be responsible for the Regional Meeting of the Association that will be held in Los Angeles on June 9 and 10 at the Statler-Hilton Hotel.

Syncro Appoints Kenner

Syncro Machine Company announces a major extension of its services to its many customers on the West Coast in the State of Texas. **George L. Morris,** Executive Vice President of the **Syncro Machine Company,** announced the appointment, effective May 1st, of the **Paul I. Kenner Co.,** as its agent, covering the States of Texas, California, Oregon and Washington.

* * *

Simultaneously with this announcement, Mr. Morris stated that a parts center is being established at the warehouse of the Paul I. Kenner Co., in South San Francisco, Calif., to service Syncro's Western customers with overnight delivery of replacement parts for Syncro equipment.

MEMO
TO CABLE MANUFACTURERS
Need cable filler specialties? Keep these Plymkraft specialties in mind:
• Insulation Braider Cord
• Fungus Resistant Cable Fillers
• Water Resistant Tissue Cable Fillers
• Stranded Polyethylene Cable Fillers
• Poly-Vinyl Chloride Cable Fillers
We will be glad to consult with you on any special cable filler problem. Call or write any office below.
296 State St. Boston, Mass. CApital 7-1134
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P.O. Box 10215 New Orleans, La. VErnon 5-7243
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PLYMKRAFT DIVISION
Plymouth Cordage Company, Plymouth, Massachusetts
Manufacturers of Waxed Cable Fillers, SJ Cable Fillers and Range Cable Fillers
PLYMOUTH
1824

Syncro Machine Company, with its main office and plant at Perth Amboy, New Jersey, and representatives throughout the world, has for many years been a leading producer of wire drawing, annealing, stranding, and special equipment for the wire and cable industry, in operation throughout the world. The announcement of the setting up of a West Coast Parts Center and the appointment of the Paul I Kenner Co. as its agent, is another step in the development of Syncro's policy of extending a wide variety of services to the wire and cable industry.

* * *

The Paul I. Kenner Co. is the only Manufacturers Representative in the West calling exclusively on the wire and cable industry in that area. Mr. Kenner has had many years of experience in the wire and cable industry in the East, and is now widely known among Western wire and cable manufacturers. His company, located in a large, modern warehouse, opposite San Francisco International Airport, at 228 Shaw

Paul I. Kenner

Road, South San Francisco, handles a wide variety of the leading lines of equipment and supplies for the wire and cable industry, as a Manufacturers' Representative.

Brush Wire Line Extended

Brush-wire in straight or cut lengths is being offered by **Hudson Wire Company,** Ossining, N. Y. in an extended list of materials. The materials include: brass; steel (Bethanized); steel, high-carbon; stainless steel; copper; phosphor bronze Grade A; silicon bronze; aluminum; nickel silver; and Monel. All may be fabricated in straight or crimped configurations. Sizes range from .018" to .002" in regular production, with other sizes available upon special order.

* * *

Hudson brush-wire may be had in hanks or in coils. Any number of ties per hank as specified by customer. Complete details are available from Hudson upon request.

New Spring Coiler and Looper Demonstrated in East

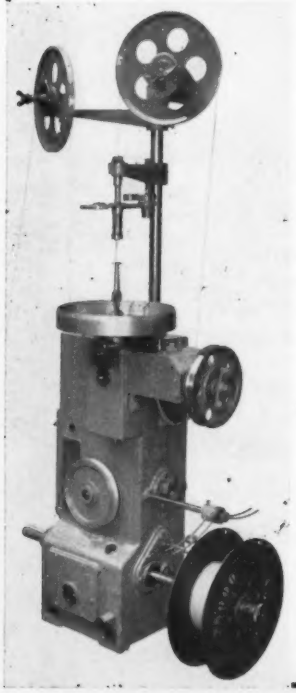
Starting back some three or so years ago the **Frank L. Wells Co.,** Kenosha, Wis., conceived the idea that spring coiling and looping could be combined.

* * *

The result was announced in 1959 in an all-mechanical combina-

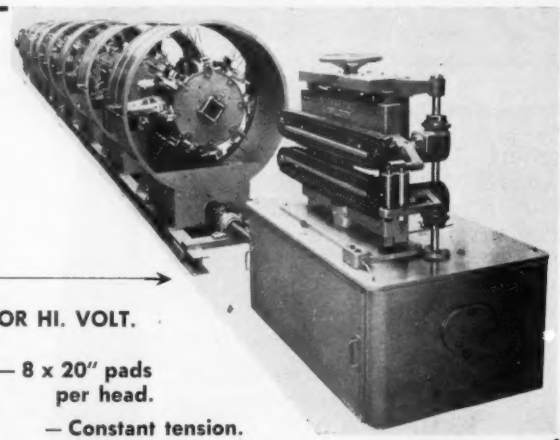
New . . .

IN PAPER LAPPING



FOR TELEPHONE

- High speed paper lapping.
- 3,000 r.p.m.
- Movable drum.
- Automatic stop.
- 12" pad.
- Electric counter.
- Central lubrication.



FOR HI. VOLT.

- 8 x 20" pads per head.
- Constant tension.
- Extensible pad centre.
- Individually braked.
- Variable die.
- Caterpillar haul-off.
- P.I.V. drive.
- Automatic stop.

POURTIER MACHINES

76 to 82 rue de la Fraternite

ROMAINVILLE (Seine) FRANCE

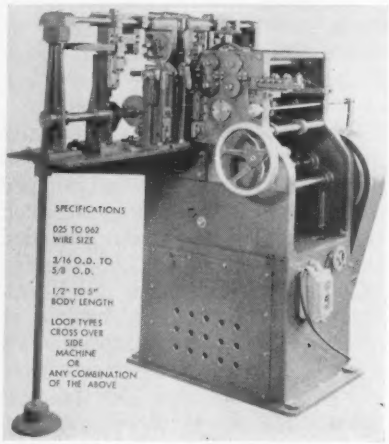
tion machine that is relatively simple in design, has great versatility in the types of loops that can be formed, and that does the job without sacrifice of coiling speed. Looping, prior to the introduction of this machine, was a slow separate job involving much manual work. The new machine eliminates all such hand work and makes loops to precision tolerances as well.

* * *

Adjustments for the varying types of loops are made easily and quickly, as the tooling is accessible in the open where it can be set for predetermined loops.

* * *

The Wells Company, no novice in the spring field as a leading pro-



Wells Spring Coil and Looping Machine

ducer of bed spring machinery, is also well-known to the wire industry as manufacturers of straightening and cutting machines.

* * *

While previously demonstrated in Chicago, this demonstration in a spring manufacturing center, Plainville, Conn., aroused considerable interest. **Walter A. Wells** was in charge of it.

* * *

Wells has appointed **Harvey Spring Mfg. Co.**, 671 No. Sangamon St., Chicago 22, Ill., as its exclusive sales representative.

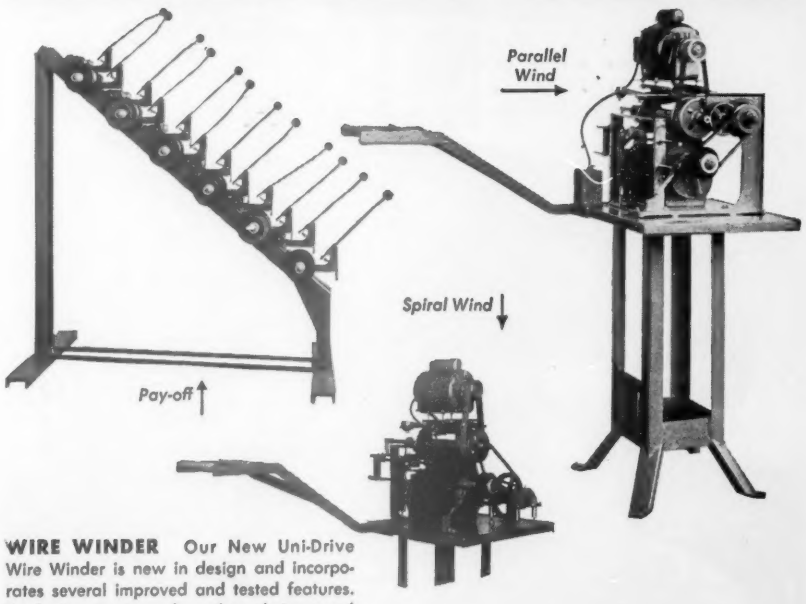
Our Advertisers are Reliable
Patronize Them

Covering Materials for Line Wire And Service Drop Cable

(*Continued from page 736*)

dip was for one minute to permit complete penetration and then four consecutive dips were made for a shorter interval to add a thin coat. These were weighed on an analytical balance (chainomatic) to four decimal places. The samples were immersed in distilled water for seven days. The samples were thoroughly dried by paper towels and weighed. The insulation was then stripped off and the bare wire weighed. Subtracting the second weighing from the first gives the grams of water absorbed. Subtracting the weight of the bare wire from the first weight gives the grams of dry insulation and the relatively small amount of paraffin that coated the ends. The weight of water divided by the weight of dry insulation multiplied by 100 equals the percentage of water. The percentages for neoprene were 1.06% and 1.04%. The values for polyethylene were 0.07% and 0.09%. The percentage

STANDARD UNI-DRIVE WIRE WINDER



WIRE WINDER Our New Uni-Drive Wire Winder is new in design and incorporates several improved and tested features. Production is stepped up through increased speed. It produces smooth, even and accurately wound spools of wire in single or multiple ends. All strands parallel — no over or under-winding. Can also be furnished with a slight spiral pattern for winding exceedingly fine wire. Automatic Stop Motion controls each strand. Traverse adjustable from 1¾" to 5½" between spool heads without changing cam. Designed especially for winding wire to be braided and shielded for electrical conductors.

Various types of supply packages that may be wound on Standard Uni-Drive Wire Winder.

PAY-OFF Our Pay-off Attachment consists of a heavy fabricated frame on which Pay-off spools are mounted to cover desired number of ends to be wound. Equipped with spindles, running on self-aligning ball bearings, with size of spindles and adapters to accommodate customers' pay-off spool. Compensating Attachment to control the tension of each individual strand of wire, applying the same tension when spool is full as when empty. Can also be adapted for use with bunching machines.

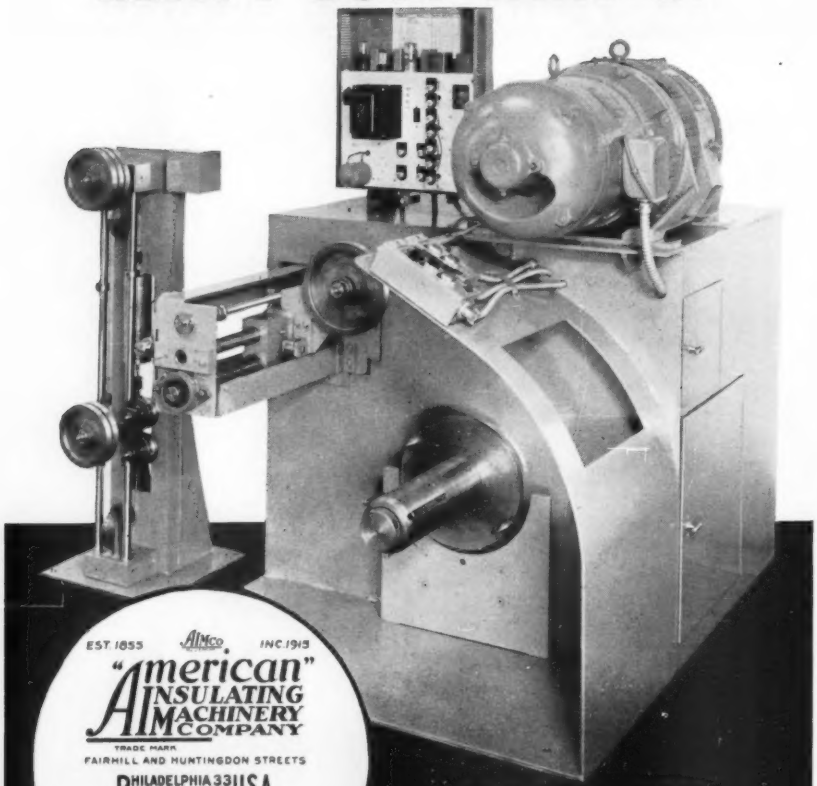
STANDARD MILL SUPPLY COMPANY
31 ESTEN AVENUE PAWTUCKET, R. I., U. S. A.

moisture absorption for VIP was 0.

* * *

A crushing test was devised with the Tinius Olsen Testing Machine. This was done because VIP seemed very hard and very tough. The wire in the sample under test was connected in series with a light bulb which was connected to one terminal of a source of electricity. The other electrical terminal was hooked to the steel plates above and below the insulation of the test sample. A lighted bulb indicated when the insulation had been crushed to the extent that it permitted a flow of current. The 10,000 pound scale was used and the results show neoprene failed at 2,720 lbs.; polyethylene, 5,400 lbs.; and VIP, 6,100 lbs.

HEAVY DUTY TAKE-UP



EST. 1855 AIMCO INC. 1913
"American" INSULATING MACHINERY COMPANY
TRADE MARK
FAIRHILL AND HUNTINGDON STREETS
PHILADELPHIA 33 PENNSYLVANIA U.S.A.
MANUFACTURERS OF WIRE INSULATING MACHINERY AND ALLIED EQUIPMENT. MACHINERY MFG. TO CUSTOMERS SPECIFICATIONS.

TAKE-UP

- Wire range .050" to .125".
- Speeds 500 to 1500 FPM.
- Multi-range constant tension winding drive.
- Automatic compensation for change in linear speed.
- Adjustable stalled and running tension and acceleration rate.
- Expansion type reel arbor; air ejection.
- Reels up to 30" diameter, 11" traverse, 1000 lbs. capacity.

AMERICAN INSULATING MACHINERY COMPANY
FAIRHILL AND HUNTINGDON STREETS PHILADELPHIA 33, PENNSYLVANIA, U.S.A.

A subzero test cabinet of the American Instrument Company was used to determine the environmental cracking at low temperature. An arbitrary temperature of 10°F was selected as this would in all probability be the lowest installation temperature to be used. Dry ice was the cooling agent and the test cabinet was equipped with blowers and heaters so that ± 1°F could be maintained. The temperature was adjusted to 10°F; and after one hour, three foot samples of VIP, neoprene, polyethylene, and a small clamp were put in and left for another hour. The clamp was fastened on a table ledge, and gloves were used. The samples were taken out one at a time and wrapped around themselves for five turns. Under a 7x magnifying glass, no cracks could be seen in the insulation of any of the samples.

* * *

The usual method for determining psi is to open up the insulation and cut a dumb-bell shaped sample with a die exactly ¼ inch wide in the center. With stranded wires this sample is buffed smooth, marked with a 2-inch mark in the center, and broken on a tensile strength machine such as Scott-Tester's. These tests were revised for 2 reasons. In the first place, when polyethylene is buffed, it is almost impossible to get a reasonably close calculation of the area. Secondly, when the VIP samples were tested in this manner, they seemed to tear rather than break. Satisfactory results could not be obtained as psi varied 25% and the elongation varied from 100 to 250%. Instead, the wires were pulled out of an 8 inch sample. This is easily done if the center wire is pulled first and the others taken one at a time. The 2-inch marks for elongation are made on the outside insulation and the tubing broken on a tensile strength machine. This also speeds up the work as the usual care in buffing is eliminated especially in regard to heat formation. The areas were obtained by the formula

$A = \frac{\pi}{4} (D^2 - d^2x)$, where A equals area, D equals outside diameter, d is the diameter of one strand

TABLE II

		VIP	Polyethylene	Neoprene
	Psi	1900	1700	1600
	% Elongation	160	375	500
Oxygen bomb	Psi	1920	1700	1520
96 hours	% Elongation	140	385	415
300 Psi	% Retentivity psi	101	100	95
	% Retentivity elong.	88	103	83
70°C Oven	Psi	1900	1575	1470
168 Hours	% Elongation	140	375	440
	% Retentivity psi	100	93	92
	% Retentivity elong.	88	100	88
100°C Oven	Psi	1940	1620	1440
48 Hours	% Elongation	140	338	385
	% Retentivity psi	102	95	90
	% Retentivity elong.	88	90	77

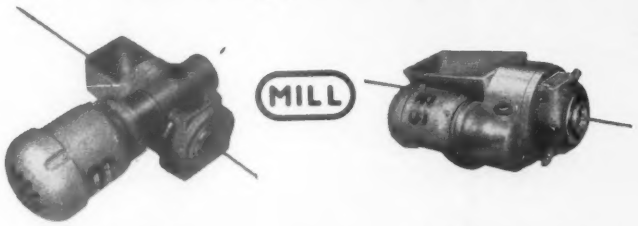
and x is a correction factor for the interstices of the inside diameter caused by the twisted wires. In this case X equals 7.3. Eight samples of each insulation were used to give a large number of results, and to furnish a more reliable average. However, the results of Table II are not necessarily the average of all 8 results. A value was discarded when it was obviously much lower than the rest of the values. The chief cause for low values was jaw-breaks. The samples were broken at a speed of 20 inches per minute. As usual psi is the load to break divided by the area; percentage elongation is the increase in length divided by two multiplied by 100; percentage retentivity is the original value divided into a similar value obtained under some other set of conditions multiplied by 100. The conditions of 96 hour oxygen bomb at 300 psi, 168 hour air oven at 70°C, and 48 hour air oven at 100°C are standard IPCEA requirements. Table II is a summary of these results.

* * *

The concluding tests of these materials were for insulation resistance. The apparatus consisted of a suitable tank as used for the dielectric test, a galvanometer of fairly high sensitivity, a battery of dry cells having an open circuit E.M.F. of 125 volts, and a Wheatstone bridge of standard resistance, scale and variable shunts. The galvanometer was mounted on a concrete pedestal to be free of vibration and its constant was 60,000 megohms. The 500 foot samples of each material were immersed in the water tank for 12 hours at room temperature. To allow for any leakage current, one terminal of the battery was grounded. The insulation resistance was computed according to

ROTATING DIE-HOLDER

for a perfectly round wire and improved die life



Type FR43
for max. outside dia. of die 1 11/16"

Type FR53
for max. outside dia. of die 3 5/32"

SOCIETA GENERALE DELLE MACCHINE MILL
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WIRE DRAWING MACHINES AND FIXTURES

General Catalogue on application

Belgium: R. Dahinden S. A., rue A. Dansaert 123, Bruxelles 1.
France: Soc. Bewe, 66, rue Saint-Sabin, Paris 11
Great Britain: Stanton Machine Tools Ltd., West Molesey, Surrey.
Japan: Asia Industry, Saiwai Bdg, Uchisaiwacho, Chiyodaku, Tokyo.
South Africa: Atlanta Ltd., P.O. Box 8347, Johannesburg
Spain: Semill, apartado 419, San Sebastian.
Sweden: S. Bergstrom & Co., Post Box 47039, Goteborg, 47.
U. S. A.: Standard Industrial Compounds Co., Frankfort, Illinois.

other countries representatives are needed

DOUBLE TWIST QUADDING MACHINE

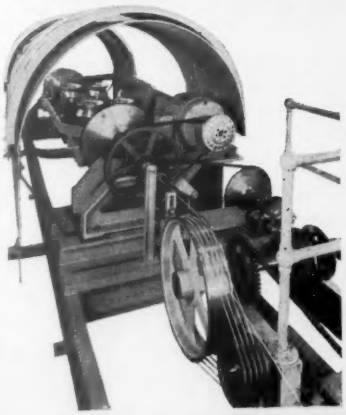
The photo shows our High Speed Light Duty Double Twist Quadding Machine viewed from the out put end.

In this construction all four reels are placed in the cradle. Each reel is mounted on an independent mandrel, rotating freely on anti-friction bearings and fitted with our patented Constant Tension and Over-Run Prevention Device.

Reel sizes vary up to 24 inches in diameter and 12 inches over all width.

Production from 1000 to 1400 twists per minute, depending upon reel size.

In size this machine is slightly wider and larger than our Standard Two Wire 30" Frame Twister.



DOUBLE TWIST QUADDER

This is a very efficient machine for the plain twisting of two, three or four wires.

For further information write to:

THE EDMANDS COMPANY

860 Wellington Ave. Cranston 10, R. I.

PRECISION DIES IN CARBIDE AND HARD METALS

Tools for bolt and screw manufacture
Screw-cutting tools
Stamping tools and every kind of precision tool

DIES FOR THE WIRE MILL
Wire Drawing
Shaped Wire
Mandrels for Tube Drawing, etc.

rivom
DIJON FRANCE

P. O. BOX 169, ROUTE DE TROYES DIJON (c.o.)

A RUGGED, DEPENDABLE
Wire Measuring Machine
for fast, accurate runs!

Wire is easily "loaded" into measuring machine from the side or the rear without having to feed through guide bushings. Brake stops measuring wheel instantly when wire leaves measuring rolls. Predetermined units will automatically stop wire at desired length. Very accurate speeds to 2500 ft. per minute.

MODEL "L-25"
Capacity .030 to 1 in. Tachometer to govern rate of speed is optional.

DURANT
MANUFACTURING CO.
1918 N. Buffum St.
Milwaukee 1, Wis.
18 Thurbers Ave.
Providence 5, R. I.

Send for Catalog No. 40

Representatives in Principal Cities

DURANT
COUNTING INSTRUMENTS

the formula $R = \frac{KLF}{1000Ds}$ where R equals insulation resistance in megohms per 1000 feet. K is the galvanometer constant and L the length of the test sample in feet. While the water temperature has a marked effect upon insulation resistance, the temperature correction factor F was omitted, as all coils were at the same temperature of 82°F., and we were interested mainly in comparisons. Also, the results were so different that correction factors would have been insignificant. D is the galvanometer deflection and s the shunt used. No scale deflection could be obtained for polyethylene. VIP had a deflection of 2.5 on shunt 1 and neoprene was 0.5 deflection on shunt of 100,000. Calculations show that polyethylene insulation resistance is beyond the range of the bridge, VIP is 30,000 megohms per 1000 feet and neoprene is 0.6 megohms per 1000 feet. The specifications of these products do not require electrical tests of this nature. However, as a means of comparison, the poor insulation resistance of neoprene is to be noted and the fact that test temperatures used are approximately equal to the average every day operating temperatures. The 12 hour soaking period would exceed the maximum moisture to which the conductors would normally be exposed.

* * *

Table III is a summary of all the physical properties of VIP, polyethylene and neoprene.

TABLE III

Property	VIP	Polyethylene	Neoprene
Specific Gravity	1.22	0.92	1.59
Flame-retardant	Excellent	Poor	Excellent
Moisture Absorption	0%	0.08%	1.05%
Heat Deformation	Good	Poor	Excellent
Electrical Overloading	Excellent	Poor	Excellent
Effect of Aging on Overloading	None	None	None
Dielectric	Poor	Excellent	Excellent
Crushing-lbs Failure	6100	5400	2720
Environmental Cracking	None	None	None
Tensile Strength - psi	1900	1700	1600
Elongation %	160	375	500
Insulation Resistance	Very Good	Excellent	Poor

We think that VIP is as good as polyethylene and neoprene for this application, considering all properties both inherent and specified. It is the writers' conclusion that VIP meets the happy medium of the three materials and should be included in published specifications.

New Vacuum Hopper Extracts Water and Air from Vinyl Insulation Prior to Extrusion

(*Continued from page 738*)

section of insulated wires extruded with and without vacuum.

* * *

Retention of elongation after oven aging is one of the most critical requirements for vinyl insulated wire as specified by Underwriters' Laboratories. Values for retention of elongation after oven aging in Table I indicate that in each compound, the use of the vacuum markedly increases this property.

* * *

The production rate of an extruder can be increased by using less water on the screw. With conventional dry blend extrusions, however, this results in increased porosity. With the vacuum hopper, extrusions have been made with a neutral or uncooled screw without porosity. Table II shows a study of the properties of insulation extruded at various degrees of screw cooling ranging from maximum to complete absence of screw cooling. This shows dramatically that maximum extrusion rate with improved properties can be obtained by use of the vacuum hopper and running with a neutral screw. Without the vacuum, porosity reaches 5% and the physical properties are impaired when extrud-

Figure 2 — Cross-section of a vinyl insulated wire showing wires insulated with (right) and without (left) vacuum. * * * *

CAMDEN WIRE CO., INC.

Wire Fabricators

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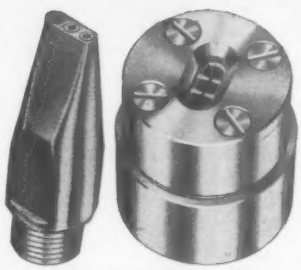

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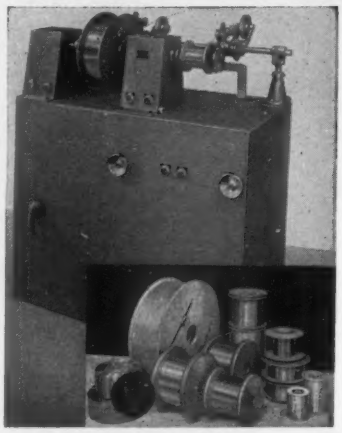

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ing with an uncooled screw.

* * *

It was previously shown in this laboratory that despite the presence of noticeable, variable and uncontrollable porosity in dry blend extrusion without vacuum, the insulation extruded from dry blend had advantages over that extruded from diced compound. Better physical and electrical properties, increased extrusion rate, and economical savings were evident with dry blend. This present study has shown that the full realization of the potentialities of dry blend extrusion can be had with the use of a vacuum hopper.

Wire Mill Production Planning and Control

(*Continued from page* 732)

sired feature.

* * *

As he plays a vital part in the implementing of his Company's policy particularly relating to delivery promises the planner must be sensible enough to accept sudden rush orders and clever enough to meet the demand. Sudden cancellations must also be accepted and skill employed in the re-arrangement of plans to make up the losses.

* * *

Daily programmes should be so prepared as to result in a minimum of production losses from such factors as die changes, block changes and — so far as possible — rod changes.

* * *

The closest possible collaboration must be maintained with those departments which are directly concerned with the supply of raw material (Rod Control) and of finished wire (Sales, and internal departments using wire). In the matter of rod supplies it is essential to discuss with the rod controller any deviation from the pre-arranged programme, and all possible notice should be given of additional requirements.

* * *

In addition to planning production programmes to conform with customer requirements it is also necessary to provide the Sales Sec-

tion promptly with delivery promises against new business.

* * *

The programme planner must also keep in close touch with the Works Laboratory over matters of chemical analysis of special steels.

Quality Control

Quality must not be sacrificed for quantity and in any mass producing concern the control of quality becomes of major importance; in order to achieve the necessary degree of control a rigid system must be devised and enforced. In our case wire-drawing machine-hands are made responsible for the gauge, quality and finish of their production — which may amount to 50 tons per shift on some classes of machines. All drawn wire is labelled with details of gauge, quality, cast number, destination and machine-hand's mark.

* * *

In order to tighten up further the control of quality, wire is tested, tied up and warehoused promptly. Tests are taken as necessary for tensile strength, elongation, hardenability, bend, torsion and reverse torsion and any irregularities found from such tests are reported and production re-adjusted or even temporarily stopped pending adjustments. By so doing, rejections are kept to a minimum if not completely eliminated. However, should rejects be incurred for various reasons, the product must be disposed of as conveniently and economically as possible — for example, wire drawn to a British Steel standard for concrete reinforcement and having failed on account of tensile, could be absorbed internally as nail wire without loss, but the fact that some rejected wire can be disposed of so easily must not allow any relaxation in the effort to prevent rejections arising.

Die Control

A mass producing wiredrawing mill engaged on a wide range of sizes must stock and use large numbers of wiredrawing dies; in order that dies be always available as required, strict attention and organised control must be accorded to this important factor. A department is set up

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in the mill for the control and storage of dies and is operated by one man per shift. His duties comprise:

(i) Maintenance of die stocks
(ii) Distribution of dies to the wiredrawing machines. (Most dies require fitting into boxes for the purpose of water cooling and the boxes must be so fitted as to prevent leaking).
(iii) Returning defective dies for reconditioning and the re-ordering of dies from the Works Die Store.
(iv) Keeping dies clean, properly labelled and stored in an organised method.
(v) Maintaining methods of die cooling on the wire-drawing machine in liaison with the machine operatives.
(vi) Issue of job details to machines in liaison with programme planner and mill foreman.
(vii) Maintenance of special mill requisites, tackle and tools etc.

A certain amount of paper work is necessary for the control of dies. Defective or redundant dies are returned daily to the Works' Die Store and the numbers and sizes are recorded in duplicate on an appropriate form, a copy of which will accompany the dies whilst the remaining copy is retained. From the retained copy the corresponding dies in the Stock book will be stamped out of stock with the date of returning. For new or reconditioned dies required, a daily requisition is made out in triplicate on an appropriate form and here two copies are submitted to the Works' Die Store whilst the remaining copy is retained. On receipt of the ordered dies one copy of the requisition, on which is recorded the dies supplied, is returned to the mill and this is known as the supply note.

* * *

After checking the dies against the supply note, the numbers are recorded in the stock book and the dies stored in the correct cabinet. Every die issued to the wiredrawing machine is recorded on an appropriate form along with its time of issue and subsequent return; it is from these recordings that die productions can be calculated.

* * *

On no account should a wiredrawing machine be delayed for the want of dies and it is impor-

tant that at all times correct dies be issued. The function of die control is therefore one of considerable importance to the well being of the department, and for this reason the personnel must be very carefully selected. The die operative must be well versed in the various characteristics of dies and in the draftings employed in multi-hole continuous wiredrawing. This operative is the checker who assesses the weights required to complete a started order, and in liaison with the mill foreman enters the job details on to the machine-work board.

* * *

Provided this operative possesses the required attributes, he could well be trained into a future mill foreman.

* * *

Fixed Stripper-Swifts are used to great advantage when producing wire for internal processing such as galvanising, nails and fence making. The strippers, which are non-collapsible, come in the following sizes:

(i) 26″ diameter, overall height 6′ 6″, drawing height 5′6″ allowing a production weight of 20 cwts. approximately in wire sizes .156″ to .320″ diam., drawn on single hole machines.

(ii) 26″ diameter, overall height 5′ 9″, drawing height 4′9″ allowing a production weight of 15/20 cwts. in wire sizes .156″ to .320″ diameter, drawn on single hole machines.

(iii) 22″ diameter, overall height 5′3″, drawing height 4′0″, allowing a production weight of 10 cwts. approximately in wire sizes .144″ to .072″ diameter, drawn on 2, 3 and 4 hole machines.

(iv) 18″ diameter, overall height 5′3″, drawing height 4′0″, allowing a production weight of 7 cwts. approximately in wire sizes .072″ to .045″ diameter drawn on 6 hole machines.

* * *

These act as a stripper in the wiredrawing block and subsequently as a swift in other processing departments.

* * *

Approximately 700 tons of wire is drawn in this form weekly for galvanising, in addition to approximately 900 tons for nail making and 100 tons for fence making. Productivity has been vastly increased both in the wire mill and

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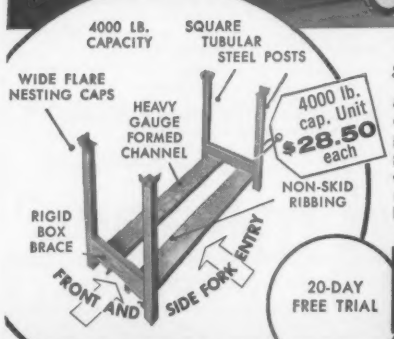

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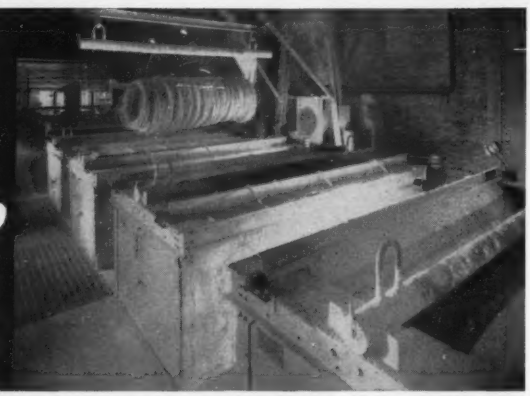

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the processing departments by adapting to take wire in this form. Efficiency is increased in the wire mill since the wiredrawing machines are able to run for long periods producing the heavy weight coils and thus reducing idle time through stripping. Storage space is saved and a great deal of tying up eliminated.

* * *

In the process departments, longer runs are obtained on their machines and loading time greatly reduced. Storage space is again saved.

* * *

The use and turn round of these stripper-swifts require careful attention from all concerned in the supplying and consuming departments in order that bottlenecks may be avoided. An adequate but sensible number of stripper-swifts are employed and it is in everyone's interest that these are not held up by over stocking. Consuming departments must therefore be efficient in their ordering and general controlling of wire stocks, otherwise the wire mill would very soon be faced with a shortage of stripper-swifts.

Management and Supervision

Little has been mentioned of these functions since this would command a separate paper, but it is said that good administration and good production planning will lead to good control and this means SERVICE.

New Freedom in Casting Design Achieved with Stainless Steel Braid

(*Continued from page* 741)

sages for oil, fuel, coolant, and hydraulic systems fluid. Integrally cast passages can be branched and tapped in almost limitless configurations. Weight is saved because the core is removed. Thus, the entire casting is made of the lightweight magnesium with no foreign material left in. If a casting must be scrapped, the reclaimed metal is as pure as the original.

The Design of Dies for High-Speed Wire Coating

(*Continued from page 728*)

and is not the same type as that normally associated with melt fracture.

* * *

The calculated maximum output of this die at a wire speed of 2000 ft./min. is 97.6 lbs./hr. Then, too, the wall thickness of the coated wire using an orifice this large is economically too heavy; however, if the radius is made smaller, the shear rate value becomes higher For the 6° taper a shear rate of about 51,000 sec. $^{-1}$ without melt fracture was possible, but by using a smaller taper the critical shear rate would be raised to a higher value.

Land Length

The next step in designing a die for high speed wire coating is to determine the land length. A series of experiments was conducted with different lengths in an effort to find the optimum. Two dies were fabricated, one with a flow channel having a 30° included angle; and the other having a 12° included angle; both had a 0.044-in. orifice and a land 1.00 in. long. The 30° taper was purposely chosen because in the experiments on flow channels this taper gave the most difficulty in obtaining a smooth coating.

* * *

Polyethylenes A and B were run using each die with the 1.00-in. land at various wire speeds to find the critical shear rate. After each resin had been run, the die land was shortened by 0.250 in., and each resin was again run on both dies with the shortened land. The procedure was continued for land lengths of 0.750, 0.500, 0.250 and 0.100 in.

* * *

In general, the die with the 12° taper gave better results than the one with the 30° taper. This result was expected, since it was shown previously that the smaller angles would result in smoother coatings.

* * *

Coatings from polyethylene A on the 12° taper were borderline smooth at 600 ft./min. with a 0.100-in. land, slightly rough at 400 ft./min. with a 0.250-in. land,

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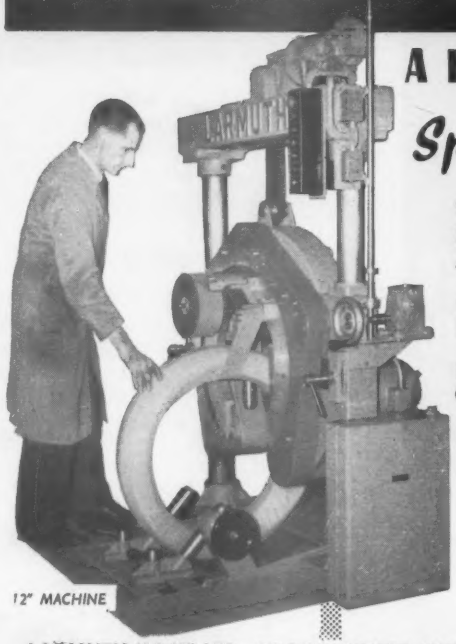

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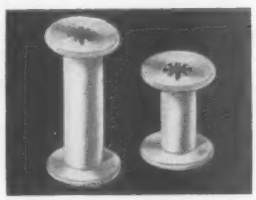

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and smooth at 1200 ft./min. with 0.500-, 0.750-, and 1.00-in. lands. The same resin on the 30° taper,

FIG. 13 Effect of land length on degree of smoothness using 0.3 M.I. Polyethylene.

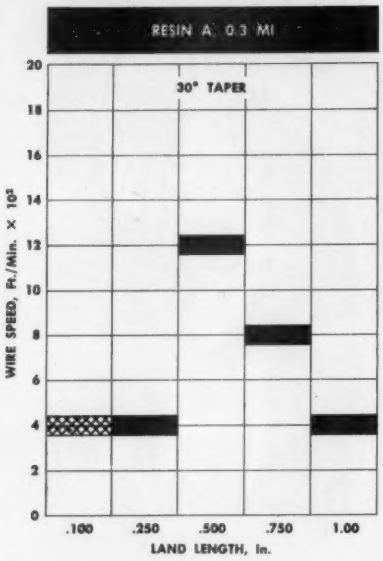
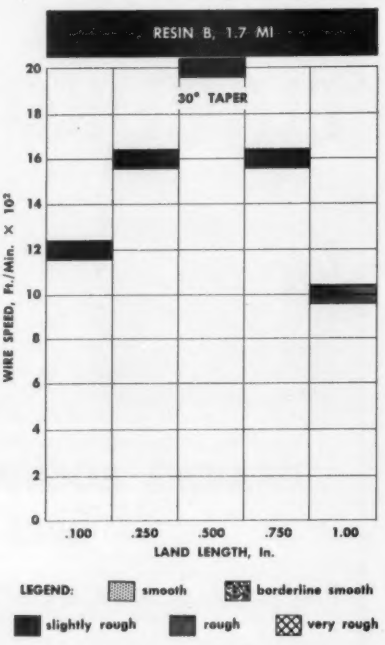
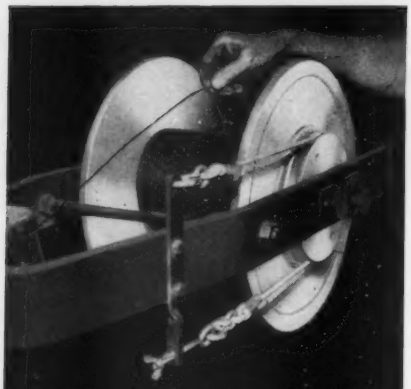


FIG. 14 Effect of land length on degree of smoothness using 1.7 M.I. Polyethylene.



as shown in Fig. 13, extruded at a higher wire speed with the 0.500-in. land for a particular degree of smoothness than for any other length; however, this speed was lower than the speed obtained using the 12° taper.



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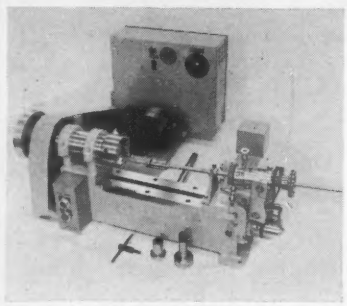

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Coatings from polyethylene B were smooth at 2000 ft./min. on the die with the 12° taper for each land length, except the 0.100 in. The coating was smooth on this land through 1600 ft./min. and borderline smooth from that speed through 2000 ft./min. When the die with the 30° taper was used, as shown in Fig. 14, polyethylene B also extruded at a higher wire speed with the 0.500-in. land, for a particular degree of smoothness, than for any other length.

* * *

Similar results were obtained with two other polyethylenes. The optimum land length was determined to be 0.500-in. Since the orifice diameter is 0.044-in., the length-to-diameter ratio is 11.34.

Conclusion

It was shown experimentally that the critical shear rate was increased by using smaller taper angles in the flow channel and by improving the flow properties. Improved flow properties can also be obtained by using a higher melt index resin or higher melt temperatures. It was shown that there was an optimum land length, and in this case the ratio of land length to orifice diameter was 11.34. Further work is being done to determine if the same ratio holds for different orifice sizes and if small tapers just prior to the land affect the land length.

* * *

Thus, for a particular polyethylene, a die for high-speed wire coating can be designed successfully by giving proper consideration to the programming of the rate of increase in shear rate, the effect of the angles and lengths of the tapers, and the ratio of the land length to the orifice diameter.

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1. **R. M. Schulken, Jr., "The Cause of Melt Fracture and Its Relation to Extrusion Behavior", paper to be presented at the 16th Annual Technical Conference of the Society of Plastic Engineers in Chicago, Illinois, January, 1960.**

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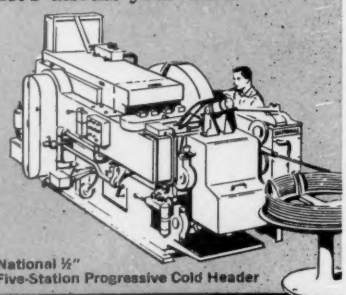
These important parts are cold-formed from coiled wire, start to finish in compact, efficient National Cold Headers.

Three are formed with no scrap loss. Two are ready to use! All five achieve remarkable savings over past methods.

If you make odd-shaped parts, may we help you evaluate them for cold-forming from wire? Better yet, come to Tiffin, witness our demonstrations and let's discuss your work.



National ½"
Five-Station Progressive Cold Header

NATIONAL MACHINERY CO.
TIFFIN, OHIO, U. S. A.
HARTFORD DETROIT CHICAGO

For Real Economy Use

Wire Dies For

Stranding
Bunching
Re-Spooling
→ R-3 ←

Tinning
→ R-3T ←
→ R-3G ←

HEANIUM® DIES — economical when used for applying heavy coat OF TIN TO WIRE. Tin does not adhere to polished Heanium®. Can be used in place of more costly materials for heavy tinning, offering great saving. HEAT OR ACID HAS NO AFFECT ON HEANIUM®. → Available mounted or unmounted, rough cored or finished to size. Easily recut on standard die equipment in a fraction of the time required by other materials.

Physical properties:
Absorption — 0.00.
Rockwell C hardness — 70 to 72.
Safe operating temperature 1200° F.

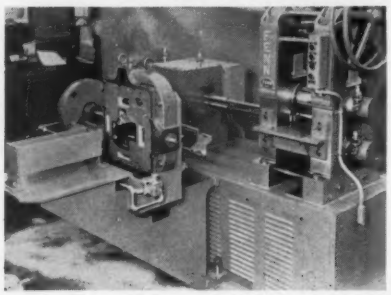
TRY THEM — ORDER NOW

HEANIUM® DIES are manufactured exclusively by

ROUX WIRE DIE WORKS, INC.
ORISKANY, NEW YORK
Tel. REdwood 6-2373 - Utica, N. Y.

Introduces New 2 in 1 Rolling Mill

The Fenn Manufacturing Company, leading producer of precision metal forming machines, has developed a unique 2 in 1 Combination Rolling Mill and Wire Drawing Machine. The unit was designed to meet the special requirements of many metallurgical laboratories where versatility and compactness are essential. The unit includes, on a common base, Model 4-053C Two-High/Four-High Three Way Precision Rolling Mill, and a Wire



Drawing Attachment for producing various shapes from round wire, such as squares, rectangles, trapezoids, etc. The latter includes a draw die box, a Model 4U Turks Head and a shedding type drum. Both the Rolling Mill and Wire Drawing Attachment derive their power from a common drive. The cost is considerably lower than that of separate units because of the common drive and bed.

* * *

For complete information, write to **John H. Charpentier,** The Fenn Manufacturing Company, Fenn Road, Newington, Conn.

Mettler Appointment

Mettler Machine Tool, Inc., manufacturers of the noted Shuster Automatic Wire Straightening and Cutting Machines, has announced the appointment of **Tornquist Machinery Company,** 3825 Santa Fe Ave., Los Angeles, Cal., as their exclusive sales representative in entire States of California and Arizona for their Shuster equipment.

* * *

Tornquist recently opened branch office at 864 Burlway Road, Burlingame, Cal., to cover Northern California area.

Guide To Silicone Materials

This recently published 12-page engineering guide explains how various physical forms of silicones contributed to reliability, miniaturization, modularization and environmental protection; increase serviceability over wide extremes of temperature; and aid value engineering.

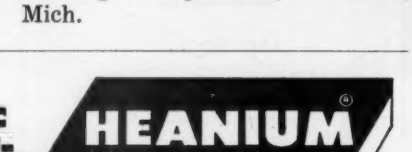
* * *

Well-illustrated, this new "materials handbook" contains engineering data and processing information on silicones, and details the important electrical and mechanical properties of the silicones most useful in electronics. It describes typical applications for silicones in every area of use — from satellites to seismographic instruments, from computers to servo motors.

* * *

To obtain your copy, write **Dow Corning Corporation,** Midland, Mich.

WITHSTANDS HI-SPEED PRESSURE OF SYNTHETIC YARNS AND WIRE WITHOUT WEAR OR DAMAGE



EYELET ES-125

BUSHING BB-600

HEANY INDUSTRIAL CERAMIC CORP.
P. O. BOX 530 NEW HAVEN 3, CONNECTICUT

A New Wire Temperature Meter

(*Continued from page 723*)

which are particularly suitable for this temperature range and therefore is limited to low temperature measurement. There is no fundamental reason however why the unit should not be redesigned, and with the use of pulleys of alternative alloys or even rare metal, the temperature range could be considerably extended. This redesigned instrument, however, with its greater range would not be quite so suitable for the measurement of drawn wire temperatures. A difficulty at present is that the calibration rig described in this paper is not suitable for operation at these high temperatures, but one could be designed on the same principles, however, for this temperature range. At these high temperatures scale may cause difficulties with the electrical contact between the wire and pulleys but it should be possible to overcome this in many instances. Where resistance heating is used, the meter in its present form has to be applied outside the heating zone, but the pulley assembly could be redesigned using a single wheel of dissimilar metals insulated from each other in the centre to overcome this limitation.

Acknowledgments

The author wishes to thank the manufactures, Messrs. Addison Electric Company Limited, 10/12 Bosworth Road, London, W.10, for their assistance in this work and **G. D. Spenceley** for his early work on the non-contact temperature meter.

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5. **D. Lewis and H. J. Godfrey. Wire & Wire Products, 1949, 24, 873.**

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Music Wire for Industrial Purposes
211 sizes Bright Polished, .0015" to .250"
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Aluminum—Annealed—Belt Lacing—Brass, Soft and Spring—Copper, Bare and Tinned
Coppered Steel Spring—Galvanized—Tinned
Monel—Nickel Silver—Pure Soft Nickel—Oil Tempered, Steel Spring, Black Finish
Phosphor Bronze, Spring Temper—Pure Iron Wire—Resistance Wire,
Hoskins Chromel "A"—Stainless, Soft and Spring Temper—Tag Wire, 1000
in an Envelope—Florist Wire—Spooled and Coiled, ¼-½-1-5#
Wires Straightened and Cut to length—Small Gauges—Small orders our specialty
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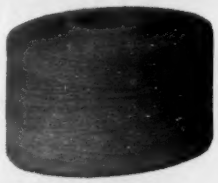
THE SYMBOL OF EXCELLENCE IN WIRE
PROCESSING AND TESTING EQUIPMENT

COTTON YARNS



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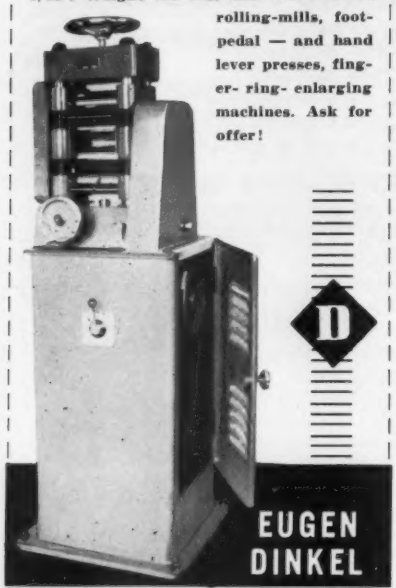
DOUBLE ROLLING-MILL,

electric-driven, rollers 2.½" x 5.⅜" long. for sheets ⅝" to 1/128", for wires 5/16" to 1/25". Weight 495 lbs. Also hand-driven rolling-mills, foot-pedal — and hand lever presses, finger- ring- enlarging machines. Ask for offer!



EUGEN DINKEL

T. H. ROHRS AGENT
26 COURT ST., BROOKLYN 1, N. Y.

New Type Stitching Wire

A new two-color specifications sheet on Econo-Stitch box stitching wire, showing how its unique rounded-shape accounts for 22 more feet per pound at no extra cost when compared with standard shape stitching wire, is available on request from **Enterprise Wire Company,** Blue Island, Illinois.

* * *

The sheet outlines advantages of smoother box closure, flexibility of operation in any standard box-stitching machine without need for modification or attachments, lists sizes and finishes available.

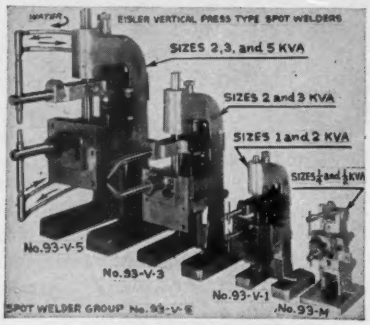
New Fine Wire Catalog

The Maryland Fine & Specialty Wire Co., Cockeysville, Md., has issued an unusual and refreshingly different catalog, treating the development of wire making from the days of Nineveh down to its own modern manufacturing procedures.

* * *

Eisler Makes The Largest Selection of Small Spot, Wire, Butt, Seam and Foil Welders. Send for Cat. #93-57

A WELDER FOR EVERY PURPOSE



Write for Catalogue 88-60

EISLER ENGINEERING CO., INC.
CHARLES EISLER, Jr., Pres.
747 South 13th St. Newark 3, N. J.

Profusely illustrated with sketches of serious and humorous nature, the catalog gives technical data on the company's many stainless and carbon steel wires.

* * *

Pictures of the original and present plants, of the executive personnel and some auxiliary information on testing, packaging, etc., is included.

* * *

For a copy of the catalog, please address requests to the company.

Company Formed to Produce Welded Wire Mesh

A new company has been organized in New Orleans, the **Southeast Steel & Wire Corporation,** to manufacture welded wire reinforcement mesh and other steel wire and steel products for the construction industry.

* * *

A plant with an initial capacity of 100 tons a month is soon to be built. Its officers are **Kurt Orban,** Chairman; **Arthur Nichols,** President; **Joseph Reagan,** Vice President; **Albert Baldwin, Jr.,** Vice

WE BUY WE SELL

60 16-Carrier Wardwell Braiders with 14" Capstans individually motor driven.

8 24-Carrier Wardwell Braiders with 24" Capstans individually motorized.

WIRE & TEXTILE MACHINERY INC.
P. O. BOX 436, PAWTUCKET, R. I.

FORMULA FOR SUCCESS
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SYNTHETIC THREAD COMPANY (YARNS+PROCESS+SERVICE)=$UCCESS∞

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EXACT CONSISTENT to GOV'T SPEC.

OUR PROUDEST ASSET
ALL PUT-UPS STANDARD OR SPECIAL

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SYNTHETIC THREAD CO.
238 W. GOEPP ST., BETHLEHEM, PA. Tel.: UNiversity 8-8575

President — Manufacturing; **Hugo Rothchild,** Treasurer; and **A. A. Patterson,** Secretary.

* * *

The company is affiliated with **Florida Wire Products Corp.,** Miami, and **Southwest Wire Products Corp.,** Dallas, who make concrete reinforcing wire mesh.

New High Density Polyethylene for Wire

Union Carbide Plastics Company has announced a significantly improved high density polyethylene compound for wire and cable applications. The new resin, Bakelite DGD-4100, combines the advantages of greater toughness, high abrasion resistance, reduced compressibility and better heat deflection with greatly improved resistance to stress cracking and thermal embrittlement.

* * *

The new formulation is described in Extrusion Technical Release No. 19, available from Union Carbide Plastics Company, 30 East 42nd Street, New York 17, N. Y.

Wire Machinery Firm Liquidated

The Mercer Robinson Engineering Corporation, Clifton, N. J., following the death of its president last Fall, has been completely liquidated and its production equipment and several plants sold.

* * *

Sidney R. Dresser, Manager of the Robinson Division, a familiar figure in wire circles, who had been responsible for the design and manufacture of wire processing equipment, is therefore no longer connected with the firm and has retired from active work in the wire industry.

Wire Kinks

(*Continued from page* 747)

through subsequent rolling and drawing operations.

* * *

Coating metals with another metal is a highly technical business, the selection of a suitable process for which depends entirely on ultimate processing and end-uses. The determination of a best method is a job for a technical specialist.

CUT YOUR PRODUCT COST . . .

Stop struggling with wire worries. There's a Continental wire to help cut products costs—to add sales appeal. Let us know about your problem . . . Let Continental's helpful wire service work for you.

CONTINENTAL STEEL CORP. STEEL CONTINENTAL WIRE KOKOMO, IND.

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TRADITIONAL IMPORTERS OF STEEL PRODUCTS

Wire Rods and Wire, bright basic, black annealed, and galvanized, in all usual qualities and for many specialty purposes, including Box Binding Wire, Spring Wire, Mattress Wire, Core Wire, Rope Wire, etc.

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FINE NON-FERROUS WIRES

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Sales Offices
Bellefonte Philadelphia
Pittsburgh New York

Establishes German Subsidiary

Richard J. Ruff, President of **Catalytic Combustion Corp.**, Detroit, has announced the formation of a European subsidiary, KAVAG (Katalytische Verbrennungs Geselleschaft M. B. H.), with offices and plant at (16) Gondsroth, Bei Hanau, Nebenstrasse 19, West Germany.

* * *

The new firm will manufacture catalysts and Catalytic Combustion systems under a patent license from the parent company. **Erwin C. Betz**, formerly Plant Engineer for Catalytic Combustion Corp., has been appointed Managing Director of KAVAG.

* * *

In the 10 years since its introduction, the company's process has become widely recognized for its ability to destroy noxious industrial odors and fumes, converting them into valuable heat energy by low temperature catalytic oxidation.

WIRE DRAWING MACHINERY
AND EQUIPMENT

FINE WIRE MACHINES • SPOOLERS • POINTERS
PATENTING, TEMPERING, GALVANIZING AND TINNING EQUIPMENT FOR WIRE

Wire Blocks Made To Suit Your Needs

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SUPERIOR TOOL & MANUFACTURING CO.
SHREWSBURY STREET WEST BOYLSTON, MASS.

WICKWIRE BROTHERS, INC. CORTLAND, N.Y.

American producers of magnet wire now lead all other industries in the use of the process. Over 1200 wire enameling ovens are now equipped with catalysts and many other electrical manufacturing operations are employing the process.

* * *

It is expected that European manufacturers having enameling and painting operations will follow our lead in increasing numbers, especially due to the high cost of fuel and the heat recovery potentials of the Catalytic Combustion process.

High Strength Wire Rope Slings

Offering greater safety and strength than heretofore, a new series of Double Green Stripe, ACCO-Registered VHS Strand-Laid Wire Rope Slings have been announced by the Wire Rope Sling Department. **American Chain & Cable Company, Inc.**, Wilkes-Barre, Pa.

* * *

Said to be the strongest slings in the world, they are fabricated from a superior grade of uniform analysis, high carbon steel and processed in an improved manner to give the characteristics needed in a heavy-duty wire rope. Size for size, these VHS slings are at least 15% stronger than the highest normal grades of Improved Plow Steel slings. This higher tensile strength results in a stronger product without increasing rope diameters.

* * *

Having a factor of safety of approximately 5:1, these ACCO-Registered Strand-Laid Wire Rope Slings are available in 20 different diameters ranging from ¼ in. to 3 in. Vertical lifting capacity of the smallest sling is 1350 lb., while the largest is rated at 166,000 lb. These slings can also be arranged as chokers, baskets or bridle assemblies to accommodate varied loads.

200,000 Volt DC Voltmeter

A 200,000 volt DC voltmeter features two piece construction for remote metering, convenient direct reading linear scale, rugged

construction and conservatively rated components, safe operation, low drain, and reversible polarity.

* * *

Composed of a high-voltage multiplier resistor in a tall bakelite tube and an indicating instrument in a small metal cabinet at ground potential, Model M200DC Kilovoltmeter has an input resistance of 2,000 megohms, a 4½" square indicating instrument, and will take an overload of 150%. A large corona shield minimizes corona and a neon gap overvoltage circuit protects the indicating instrument.

* * *

The multiplier circuit is completed to ground thru a neon so that high voltage cannot appear on the indicating instrument even if it should open up.

* * *

For further details, write **Peschel Electronics, Inc.**, Towners, Patterson, N. Y.

To Make Plastic Coated Fencing

The Beautylink Fence & Wire Ltd., has been incorporated by **Standard Wire & Cable Ltd.**, Toronto, Ont., Canada, to manufacture plastic coated chain link fencing, using galvanized steel wire as a base. Six standard colors will be available.

* * *

Wire will be drawn and galvanized in the conventional manner, coated by standard in plastic extrusion machines and delivered to its new subsidiary for forming into fencing.

* * *

A potential Canadian market of a million dollars annually is foreseen by **E. S. Rose**, Standard's chief executive, with additional benefits accruing from exports to the United States.

Opportunity for Inventors

The Cleveland Engineering Society, at its National Inventions Conference and Exhibition on June 20-24 plans to give inventors a break by arranging to have inventions exhibited for the modest fee of $8.00, so that investors and manufacturers can see and con-

BALLOFFET VIANNEY WIRE DIE CO., Inc.

All sizes from .104" down to .0004" in stock

Manufacturers of Quality diamond dies since 1870

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Satisfactory DIAMOND DIES can only be made by those who have experience, skill and knowledge. WAYNE has all of these. Users have called WAYNE DIES "the best."

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For assured quality, accurately graded diamond powders

Specify
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RECLAIMING SERVICE

We also reclaim and return to you the diamond content, guaranteed 99% pure and graded for further use.

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DESIGNED FOR LONG LIFE AND MAXIMUM WIRE PRODUCTION

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sider them. The fee will only be charged for those inventions accepted for exhibit.

* * *

Additional information on how to exhibit patented items or processes may be obtained from the Society at 3100 Chester Ave., Cleveland 14, Ohio.

Revised Data Book on Aluminum Conductors

A key tool for electrical utilities — "Aluminum Electrical Conductors-General Engineering Data" — has been revised and greatly expanded, less than two years following its initial publication by **Aluminum Company of America's Rome Cable Division.**

* * *

The publication lists immediately available sag and tension charts for covered and bare aluminum conductors, and ACSR (Aluminum Conductor, Steel Reinforced). The original publication listed nearly 4000 charts available from Alcoa — by far the most comprehensive series available in the industry. The revision lists an additional 600 charts.

* * *

Copies of the 100-page data book designed for use by utility engineering and purchasing departments, may be secured from any Alcoa-Rome sales office, or on request to 736 Alcoa Building, Pittsburgh 19, Pa.

Pancake Motor Base

For use in variable-speed sheave installations where space is at a premium, sliding motor bases of the low "pancake" type are announced by **T. B. Wood's Sons Co.,** Chambersburg, Pa. An attractive feature is the provision for rapid release of the adjusting screw. The motor base can be moved quickly and easily to shorten center-to-center distance and free V-belts from the grooves for sheave adjustment.

* * *

The new "Quick-Slide" bases are extraordinarily low. Height is only 1 9/16 or 1 21/32 inches, depending on NEMA motor frame number. Amount of movement is either 4½ or 6 inches. Bases with

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For many years . . .
Outstanding in quality,
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For Precision Wire Drawing
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REVERSIBLE DIAMOND DIES
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METALLIZING WIRE
PURE ZINC and CADMIUM
Other Fine Bare Wires
Manufactured to Your Specifications
IMMEDIATE DELIVERY
STAMFORD PROCESSING CO.
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QUICK DELIVERIES ON
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SCREW TYPE TRAVERSES
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Rod Frames — 16" Frames, 8" Frames — Take-Up Frame, Wire — Pointers — Pulley Tongs — General and heat resisting alloy castings for wire mill use.
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TRENTON, N. J.

9-inch movement can be furnished on special order. The top plate of the motor base is drilled to accommodate various combinations of NEMA motor frames.

* * *

"Quick-Slide" bases may be used with any V-belt drives but are particularly designed for use with variable-speed drives where it is necessary to vary the center distance between sheaves with pitch-diameter changes.

Bethlehem Expanding Sparrows Point Capacity

The Sparrows Point plant of Bethlehem Steel Company is enlarging its ingot production facilities by 10 percent to a rated capacity of 8.2 million tons per year.

* * *

In the wire mill, new wire drawing machines and auxiliary equipment are being installed to increase the light gage wire capacity by 3000 tons per month, and new high speed galvanizing units will be added that will up the production of "Bethanized" wire.

New Tube-Cooled Motors

The Louis Allis Co., Milwaukee, has announced the introduction of Tube-Cooled air-to-air heat exchanger motors.

* * *

These motors, ranging up to 2000 HP, are built in standard enclosed construction for use in non-hazardous locations and in explosion-proof construction with Underwriters Laboratories Class 1, Group D Label for use in hazardous locations.

* * *

Tube-Cooled motors are designed to operate in unfavorable environmental conditions, providing protection against excessive moisture, oil vapor, chemicals, alkalies, cool-

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DIVISION OF THE CARPENTER STEEL CO., NEW BRUNSWICK, N. J.

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Quick Trigger Action
For Wire Drawing, Insulating, Enameling and Coil Winding
American made and serviced, always reliable
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Patented

WORLD'S LARGEST MANUFACTURER
SPIRAL WRAPPING MACHINES
For Coils or Straight Lengths
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U. S. Tool Co. No. 22, 28, & 33 Multislides
Sleeper & Hartley Spring Coilers Nos. 0, 1, 2, 3, 3½, 4, & 5 & Torrington W10 & W12
Vaughn No. 8, 10, & 12 Moto-Blocs
Waterbury No. 3 Bull Blocks, Duplex
Morgan 4 stand Wire Drawer with pointer and 100 H.P. motor drive & motor
Waterbury Nos. 1, 2, & 3 Continuous Wire Drawing Machines
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ant and air-borne dust, sand, dirt, and metallic particles.

* * *

For complete information write for Bulletin #2400, The Louis Allis Co., Dept. P., Milwaukee 1, Wisconsin.

Union Carbide Appoints Assistant Regional Manager

Gerrit V. Lydecker has been appointed Assistant Regional Manager in the New England Region of **Union Carbide Plastics Company**, according to **L. D. Burnett**, Regional Manager. Mr. Lydecker will supervise the sale of Bakelite Brand polyethylene, phenolic, styrene, and vinyl resins and compounds for molding and some forms of extrusion, including contour and wire and cable applications. He will be located in the Regional sales office at 410 Asylum St., Hartford 3, Conn.

* * *

Mr. Lydecker was graduated from Stevens Institute of Technology in 1951 with a Bachelor of Science degree in Mechanical Engineering. He joined Union Carbide Plastics Company the same year.

Forms Engineering Firm

Richard R. Thompson, formerly Director of Manufacturing of **Raychem Corporation** in Redwood City, Calif., electric wire and cable manufacturers, has organized **Thompson Associates** at 1360 Garden Lane, Menlo Park, Calif.

* * *

Mr. Thompson heads the firm as president. The firm will render engineering services, act as manufacturers representatives, and serve as wire mill consultants. Mr. Thompson is a member of **The Wire Association.**

Firth Sterling Appoints Buyer

Firth Sterling Inc. has appointed **Lewis W. French** buyer of engineering products in the purchasing department of the firm's Pittsburgh headquarters. He formerly was buyer for the M. W. Kellogg Company's Hopkins division, Jersey City, N. J., which Firth Sterling purchased last year.

EXECUTIVE AVAILABLE
Ten years experience in electrical wire and cordset manufacture as general manager and production manager. Degree in E.E. Age: mid-thirties. Reply to Box 1032.
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453 Main Street Stamford, Conn.

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3 - Oswego Step Cone, 13 Die Drawing Machines
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Tel. BIgelow 8-2500

1 8-spindle Malines Ripper for carbide dies 1956
1 Polishing head for carbide dies 1956
1 Needel grinder 1956
1 2-head polisher for diamond dies 1956
1 No. 312C Lewis straightener 1/8" to ½" CAP. 1950
COLSON EQUIPMENT CO.
86 E. WARNER RD., AKRON 19, OHIO

Would like to contact two or three men interested in plastic-insulated wire and cable manufacturing business. Would require services as well as some capital. Reply to Box No. 1034.
WIRE AND WIRE PRODUCTS
453 Main Street Stamford, Conn.

WIRE ENGINEER
Midwest wire mill needs good man with practical experience in steel wire manufacture. Background should include development of plant processes to reduce cost, and supervision of maintenance layout, procurement, and production. Excellent opportunity for the right man. Replies confidential. Write Box No. 1033.
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453 Main St. Stamford, Conn.

WANTED
To invest in bare copper or insulated wire mill and participate in management. 15 years experience in wire manufacturing and sales, including Teflon wire. Principals only. Reply Box 1035.
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NATIONAL FINDINGS CORP.
125 W. 45th St., New York 17, N. Y.
Tel.: JUdson 6-5893

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ABRASIVES—
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Norton Co., Worcester, Mass.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ANNEALING MACHINES — Electric Resistance
Syncro Machine Co., Perth Amboy, N. J.

ANNEALING POTS AND BOXES—
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

BAKERS—
(See OVENS—Rod Bakers)

BOBBINS—Braider & Wire Weaving
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Associated American Winding Machinery, Inc., New York, N. Y.
Molded Fiber Glass Tray Co., Linesville, Pa.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Plastic Mold & Engineering Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

BORAX—Wire Drawing
United States Borax & Chemical Corp., New York, N. Y.

BORON CARBIDE—
Norton Co., Worcester, Mass.

CABLE FILLERS—Paper
Ludlow Papers, Needham Heights, Mass.
Plymouth Cordage Company, Plymkraft Division, Plymouth, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

CAPSTANS—for Wire (also Caterpiller Types)
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Davis Electric Co., Wallingford, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Larmuth & Bulmer Limited, Manchester, England

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Carter & Co., Ltd., B. & F., Bolton, England
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CLEANERS—Metal
Apex Alkali Products Co., Phila., Pa.
Magnuson Products Corporation, Brooklyn, N. Y.
Miller, R. H., Co., Inc., Homer, N. Y.
Parkin Chemical Corp., The, Pittsburgh, Pa.
Standard Industrial Compounds Co., Frankfort, Ill.

CLEANING & PICKLING EQUIP.—
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

CLOTH—WIRE, All Metals
Wickwire Bros., Cortland, N. Y.
Wisconsin Wire Works, Appleton, Wis.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N. Y.
Miller, R. H., Co., Homer, N. Y.
Parker Rust Proof Co., Detroit, Michigan
Standard Industrial Compounds Co., Frankfort, Ill.
United States Borax & Chemical Corp., New York, N. Y.

COLOR CONCENTRATES—For Wire Coatings
Blane Corporation, The, Canton, Mass.

COMPOUNDS—Coppering
Miller, R. H. Co., Inc., Homer, N. Y.

COMPOUNDS—Diamond (Pre-Mixed)
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Rusch Wire Die Corporation, Croton-on-Hudson, N. Y.

COMPOUNDS—Extrusion, for Wire
Blane Corporation, The, Canton, Mass.
Cary Chemicals, Inc., New Brunswick, N. J.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Corporation, New York, N. Y.

COMPOUNDS—Metal Finishing
Apex Alkali Products Co., Philadelphia, Pa.
Parker Rust Proof Co., Detroit, Michigan

COMPOUNDS—Phosphate Coating
Parker Rust Proof Co., Detroit, Michigan

COMPOUNDS—Rust Preventing
American Lanolin Corporation, Lawrence, Mass.
Apex Alkali Products Co., Philadelphia, Pa.
Escambia Chemical Corporation, New York, N. Y.
Parker Rust Proof Co., Detroit, Michigan

COMPOUNDS—Rust Removing
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

COMPOUNDS—Vinyl
Blane Corporation, The, Canton, Mass.
Cary Chemicals, Inc., New Brunswick, N. J.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Union Carbide Plastics Company, Div. of Union Carbide Corporation, New York, N. Y.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N. Y.
Miller, R. H. Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.
Swift & Company, Chicago, Ill.
United States Borax & Chemical Corp., New York, N. Y.

CONDUCTORS—Flexible, Electrical
Montgomery Co., The, Windsor Locks, Conn.

CONTAINERS—Wire Packaging
(See DRUMS—Wire Packaging)

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

COUNTERS—
(See MACHINERY—Measuring Wire and Cable)

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

CUTTING TOOLS—Carbide
Eastern Carbide Corp., New Rochelle, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.

CUTTING TOOLS—Wire
Porter, H. K., Inc., Somerville, Mass.
Robinson, M. W. Co., Rockville, Conn.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIAMOND POWDERS—
Danforth Company, C.W., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Fort Wayne Diamond Products, Inc., Fort Wayne, Indiana
Hoosier Wire Die, Inc., Ft Wayne, Ind.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIAMOND POWDER RECLAIMING—
Danforth Company, C.W., Youngstown, Ohio
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Fort Wayne Diamond Products, Inc., Fort Wayne, Indiana
Hoosier Wire Die, Inc., Ft Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Indiana Wire Die Co., Ft. Wayne, Ind.
Wayne Wire Die Co., Linden, N. J.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rivom, Dijon, France
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Cold Heading
Eastern Carbide Corp., New Rochelle, N. Y.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rivom, Dijon, France

DIES—Diamond
Ajax Industrial Supplies, Inc., Ft. Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Brenon, Inc., Nixon, N. J.
Ft. Wayne Wire Die Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
National Wire Die Co., Inc., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES DIAMOND—Reversible
Indiana Wire Die Company, Fort Wayne, Indiana
National Wire Die Co., Inc., New York, N. Y.

DIES—Extrusion
Central Tool and Machine Co., Bridgeport, Conn.
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rivom, Dijon, France.
Rusch Wire Die Co., Croton-on-Hudson, N.Y
Wayne Wire Die Co., Linden, N. J.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.

DIES—Nail, Nail Cutters, Feeder Blocks, Grippers, etc.
Pittsburgh Carbide Die Co., Monongahela, Pa.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
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DIES—Roll Threading
Rivom, Dijon, France

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Rivom, Dijon, France

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Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tinning
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Roux Wire Die Works, Inc., Oriskany, N. Y.

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Rivom, Dijon, France
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DRAW BENCHES—
(See MACHINERY)—Draw Benches)

DRIVES—Variable Speed
Allis Co., Louis, Milwaukee, Wisc.

DRUMS—Wire Packaging
Hubbard Spool Company, Div., The American Pulley Co., Garrett, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

DRUMS & TRAVERSES—For Cable Reels
Hubbard Spool Company Div., The American Pulley Co., Garrett, Ind.
Republic Steel Corp., Berger Div., Canton, Ohio

DRYING EQUIPMENT—
Carl Mayer Corp., The, Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FOAM PRODUCING COMPOUNDS—
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Ajax Electric Company, Philadelphia, Pa.

FURNACES—Galvanizing Equipment
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen (W. Germany)
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Company, Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Ofenbau Fritz, G.m.b.H. & Co. K. G., Hagen, (W.-Germany)
Wilson Lee Engr. Co., Cleveland, Ohio

FURNACES—Pot (Oil, Gas, Electric)
Ajax Electric Company, Philadelphia, Pa.
Ofenbau Fritz, G.m.b.H. & Co. K. G., Hagen, (W.-Germany)

FURNACES—Salt Bath
Ajax Electric Company, Philadelphia, Pa.

FURNACES—Strand Annealing
Ajax Electric Company, Philadelphia, Pa.
Ofenbau Fritz, G.m.b.H. & Co. K. G., Hagen, (W. Germany)

GALVANIZING EQUIPMENT—(See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

GUIDES—For Wire
American Lava Corporation, Chattanooga, Tenn.
Heany Industrial Ceramic Corp., New Haven, Conn.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

INHIBITORS—Pickling
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INKS—Printing, for Insulated Wire
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Company, West Hanover, Mass.

INSULATING MATERIALS—
Blane Corporation, The, Canton, Mass.
Cary Chemicals, Inc., New Brunswick, N. J.
General Electric Company, Insulating Materials Section, Schenectady, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Plymouth Cordage Company, Plymkraft Division, Plymouth, Mass.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Corporation, New York, N. Y.
United States Rubber Company, Naugatuck Chemical Division, Naugatuck, Conn.

LACQUERING SYSTEMS—See MACH.—Lacquering Electric Wire

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., The, Philadelphia and Bellefonte, Pa.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

MACHINE CONTROLS—Electronic
Allis Co., Louis, Milwaukee, Wisc.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Wm., Machine Works, Chicago, Ill.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Blast Cleaning
Wheelabrator Corporation, Mishawaka, Ind.

MACHINERY—Bobbin Winders
Associated American Winding Machinery, Inc., New York, N. Y.
Larmuth and Bulmer, Limited, Manchester, England

MACHINERY—Bolt, Rivet, Screw, etc.
Boltmaster Co., The, Cleveland, Ohio
National Machinery Co., Tiffin, Ohio
Prutton Corporation, Cleveland, Ohio.
Straus-Artys Corp., Great Neck, N. Y.
Waterbury-Farrel Fdry. & Mach. Co., Division of Textron Inc., Waterbury, Conn.

MACHINERY—Braiding
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Edmands Company, The, Cranston, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.
Larmuth and Bulmer, Limited, Manchester, England
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Vaughn Machinery Co., Cuyahoga Falls, Ohio

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Carter & Co., Ltd., B. & F., Bolton, England
Cook Mfg. Co., The, Paterson, N. J.
Haskell-Dawes Machine Co., Philadelphia, Pa.
Larmuth and Bulmer, Limited, Manchester, England
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Capstans and Machinery—Winding Wire)

MACHINERY—Centerless Grinding & Polishing
American Laubscher Corporation, New York, N. Y.

MACHINERY—Chain Link Fence
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Steel & Wire Machinery Co., Cleveland, Ohio

MACHINERY—Chain Making
Larmuth and Bulmer, Limited, Manchester, England
Steel & Wire Machinery Co., Cleveland, Ohio
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Closing Cable
Carter & Co., Ltd., B. & F., Bolton, England
Larmuth and Bulmer, Limited, Manchester, England
Miyazaki Iron Works, Ltd., Osaka, Japan
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N.J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Fdry. & Mach. Co., Division of Textron Inc., Waterbury, Conn.

MACHINERY—Cold Heading
Boltmaster Co., The, Cleveland, Ohio
National Machinery Co., Tiffin, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Waterbury-Farrel Fdry. & Mach. Co., Division of Textron Inc., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
American Insulating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Herborn, Maschinenfabrik, Herborn, Germany
Johnson Machinery Co., Elizabeth, N. J.
Morgardshammars Mek Verkstads A. B., Morgardshammar, Sweden
National Mach'y Exch (Used), New York
Showa Machine Works, Ltd., Osaka, Japan
Steel & Wire Machinery Co., Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Fdry. & Mach. Co., Division of Textron Inc., Waterbury, Conn.
Whitacre Engineering & Manufacturing Company, Alhambra, California

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Company, Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Mettler Machine Tool, Inc., New Haven, Conn.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Dead Block (Stationary Coiler)
Morgan Construction Company, Worcester, Mass.
Wells Company, Frank L., Kenosha, Wisc.
Whitacre Engineering & Manufacturing Company, Alhambra, California
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.
Herborn, Maschinenfabrik, Herborn, Germany
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Diameter Control
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Die Making
Boulin, Victor J., Inc., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Sjogren Tool & Machine Co., Auburn, Mass.
Wayne Wire Die Co., Linden, N. J.

MACHINERY—Draw Benches
American Laubscher Corporation, New York, N. Y.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Eccentricity Control (Insulated Wire)
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Edging (See MACHINERY—Tandem Rolling and Edging Mills)

MACHINERY—Enameling
Acrometal Products, Inc., Minneapolis, Minn.
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Michigan Oven Company, Detroit, Mich.

MACHINERY—Extruding
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Johnson Machinery Co., Elizabeth, N. J.
Royle, John, & Sons, Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Flat Wire
Fenn Manufacturing Company, Newington, Conn.
Mettler Machine Tool, Inc., New Haven, Conn.
Steel Equipment Company, Cleveland, Ohio
Steel & Wire Machinery Co., Cleveland, Ohio
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Forming Wire
National Mach'y Exch. (Used), New York, N. Y.
Nilson Machine Co., A. H., Shelton, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel & Wire Machinery Co., Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Footage Meters
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Galvanizing Wire
Miyazaki Iron Works, Ltd., Osaka, Japan
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)
Steel & Wire Machinery Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Whitacre Engineering & Manufacturing Company, Alhambra, California
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle Manufacturing Corporation, Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Impregnation Control, Paper Cables
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.

MACHINERY—Insulating Wire
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Michigan Oven Company, Detroit, Mich.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine), France
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Insulation Testing (See MACHINERY—Spark Testing)

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia, Pa.
Cook Mfg. Co., The, Paterson, N. J.
Michigan Oven Company, Detroit, Mich.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
EVG., Machinen & Stahl, A. G., Zurich, Switzerland

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Diam., Insulated Wire
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wisc.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Larmuth and Bulmer, Limited, Manchester, England
National Standard Electronics, Inc., New York, N. Y.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Measuring and Control—Coating
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Measuring Width-Flat Wire
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Nail and Tack
Glader, Wm., Machine Works, Chicago, Ill.
National Machinery Co., Tiffin, Ohio
National Mach'y Exch. (Used), N.Y., N.Y.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Packaging Wire
Advanced Wyrepak Co., Inc., Bridgeport, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Whitacre Engineering & Manufacturing Company, Alhambra, California

MACHINERY—Patenting Wire
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)
Whitacre Engineering & Manufacturing Company, Alhambra, California

MACHINERY—Pin Making
Nilson Machine Co., A. H., Shelton, Conn.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Plating
Bartell Machine Tool Corp., Rome, N. Y.
Hodge Bros. Machine Shop, Ossining, N. Y.
Universal Industrial Equipment Co., Secaucus, N. J.

MACHINERY—Pointing
Herborn, Maschinenfabrik, Herborn, Germany
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Straus-Artys Corp., Great Neck, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Fdry. & Mach. Co., Division of Textron Inc., Waterbury, Conn.

MACHINERY—Printing on Electric Wire
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Company, West Hanover, Mass.
Gillies, Duncan M. Co., Inc., West Boylston, Mass.

MACHINERY—Re-Spooling
Acrometal Products, Inc., Minneapolis, Minn.
Associated American Winding Machinery, Inc., New York, N. Y.
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Herborn, Maschinenfabrik, Herborn, Germany
Hodge Bros. Machine Shop, Ossining, N. Y.
Miyazaki Iron Works, Ltd., Osaka, Japan
National Mach'y Exch. (Used), New York, N. Y.
Vaughn Machinery Co., Cuyahoga Fall, Ohio
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y Inc. (used) Pawtucket, R. I.

MACHINERY—Rod Mill
Baldwin-Lima-Hamilton, Industrial Division, New York, N. Y.
Herborn, Maschinenfabrik, Herborn, Germany
Morgan Construction Co., Worcester, Mass.

MACHINERY—Rolling Mill
Fenn Manufacturing Company, Newington, Conn.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Morgan Construction Co., Worcester, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Waterbury-Farrel Fdry. & Mach. Co., Division of Textron Inc., Waterbury, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Royle, John & Sons, Paterson, N. J.
Western Wire & Textile Machinery, Inc., So San Francisco, Calif.
Wire & Textile Mach'y Inc. (used) Pawtucket, R. I.

MACHINERY—Serving
Pourtier Pere et Fils, Romainville (Seine), France
Wardwell Braiding Machine Co., Central Falls, R. I.

MACHINERY—Slitting Mills
Steel Equipment Company, Cleveland, Ohio

MACHINERY—Spring Making
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wafios Machinery Corp., Hackensack, N. J.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Staple Making
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Straightening & Cutting
American Laubscher Corporation, New York, N. Y.
Johnson Machinery Co., Elizabeth, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Patterson, George C. Machine Co., Cleveland Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Steel & Wire Machinery Co., Cleveland, Ohio
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Stranding
Bartell Machine Tool Corp., Rome, N. Y.
Carter & Co., Ltd., B. & F., Bolton, England
Hanson & Edwards, Ltd., Warrington, England
Haskell-Dawes Machine Co., Philadelphia, Pa.
Johnson Machinery Co., Elizabeth, N. J.
Krupp, Fried., Machinen-Und Stahlbau Rheinhausen, Germany
Larmuth & Bulmer Limited, Manchester, England
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Superior Tool & Manufacturing Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Fenn Manufacturing Company, Newington, Conn.
Waterbury-Farrel Fdry. & Mach. Co., Division of Textron Inc., Waterbury, Conn.

MACHINERY—Tandem Rolling & Edging Mills
Fenn Manufacturing Company, Newington, Conn.

MACHINERY—Take-Up and Pay-Out
Acrometal Products, Inc., Minneapolis, Minn.
Advanced Wyrepak Co., Inc., Bridgeport, Conn.
American Insulating Mach'y Co., Phila., Pa.
Associated American Winding Machinery, Inc., New York, N. Y.
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Johnson Machinery Co., Elizabeth, N. J.
Larmuth & Bulmer Limited, Manchester, England
Miyazaki Iron Works, Ltd., Osaka, Japan
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine) France
Standard Mill Supply Co., Pawtucket, R. I.
Steel Equipment Company, Cleveland, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.
Whitacre Engineering & Manufacturing Company, Alhambra, California

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine) France
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Thread Rolling
Boltmaster Co., Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Prutton Corporation, Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.

Waterbury-Farrel Fdry. & Mach. Co., Division of Textron Inc., Waterbury, Conn.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)
Syncro Machine Co., Perth Amboy, N. J.
Universal Industrial Equipment Co., Secaucus, N. J.
Whitacre Engineering & Manufacturing Company, Alhambra, California

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

MACHINERY—Tube Mill, Cold Drawing
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Edmands Company, The, Cranston, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
Johnson Machinery Co., Elizabeth, N. J.
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Welded Wire Mesh
EVG, Maschinen and Stahl, A.G., Zurich, Switzerland
Schlatter, Ltd., H. A., Zollikon/Zurich

MACHINERY—Variable Speed Drives
Allis Co., Louis, Milwaukee, Wisc.

MACHINERY—for Wire Welding
(See WELDERS—Butt and Spot and Machinery—Welding Wire Fabrics)

MACHINERY—Winding Wire
Associated American Winding Machinery, Inc., New York, N. Y.
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Enjaco Corporation, Cranston, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Larmuth and Bulmer, Limited, Manchester, England
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Standard Mill Supply Co., Pawtucket, R. I.
Steel Equipment Company, Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Laubscher Corporation, New York, N. Y.
Cook Manufacturing Co., The, Paterson, N. J.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Fenn Manufacturing Company, Newington, Conn.
Herborn, Maschinenfabrik, Herborn, Germany
Hodge Bros. Machine Shop, Ossining, N. Y.
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Miyazaki Iron Works, Ltd., Osaka, Japan
Morgan Construction Co., Worcester, Mass.
Morgardshammars Mek Verkstads AB, Morgardshammar, Sweden
National Mach'y Exch. (Used), New York, N. Y.
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Showa Machine Works Ltd., Osaka, Japan
Sleeper & Hartley, Inc., Worcester, Mass.
Societa Generale Delle Macchine Mill, Milan, Italy
Steel Wire and Machinery Co., Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Superior Tool & Machinery Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Fdry. & Mach. Co., Division of Textron Inc., Waterbury, Conn.
Whitacre Engineering & Manufacturing Company, Alhambra, California
Wire Machinery Inc., Chicago, Ill.

MACHINERY—Wire Preheating
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.

MACHINERY—Wire Rope
Larmuth and Bulmer, Limited, Manchester, England
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
American Laubscher Corp., New York, N. Y.
Larmuth (1947) Ltd., Swinton, England
Terkelsen Machine Company, Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio

MOTORS—Electric
Allis Co., Louis, Milwaukee, Wisc.

NAIL TOOLING—Tungsten Carbide
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pan American Trade Development Corp. New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.

NIPPERS—Wire Cutting
Robinson, M. W. Co., Rockfall, Conn.

NOZZLES—For Extruding Machines
Central Tool and Machine Co., Bridgeport, Conn.

OVENS—Cable Lacquering and Enameling
American Insulating Mach'y Co., Phila., Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Colbourne Machine Company, Winsted, Conn.
Michigan Oven Company, Detroit, Mich.

OVENS—Rod Bakers
Carl Mayer Corp., The, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl Mayer Corp., The, Cleveland, Ohio

PAILS—Packaging
(See Drums—Wire Packaging)

PAPER—Coil Wrapping
Ludlow Papers, Needham Heights, Mass.

PAPER—Insulating
Ludlow Papers, Needham Heights, Mass.
Plymouth Cordage Company, Plymkraft Division, Plymouth, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

PAY-OUT SYSTEMS—
(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS
(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PLASTICIZERS—
Cary Chemicals, Inc., New Brunswick, N. J.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.

PLASTICS—for Wire Insulation
Blane Corporation, The, Canton, Mass.
Cary Chemicals, Inc., New Brunswick, N. J.
Escambia Chemical Corporation, New York, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Union Carbide Plastics Company, Div. of Union Carbide Corporation, New York, N. Y.
Union Carbide Corporation, Silicones Division, New York, N. Y.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Corporation, New York, N. Y.
United States Rubber Company, Naugatuck Chemical Division, Naugatuck, Conn.

PRINTING WHEELS—for Electric Wire
Daniels & Co., Frank, New York, N. Y.
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Co., Inc., West Hanover, Mass.
Gillies, Duncan M. Co., Inc., West Boylston, Mass.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

PULLEYS—Ceramic
American Lava Corporation, Chattanooga, Tenn.

RACKS—Wire Storage
Jarke Manufacturing Co., Chicago, Illinois

REEL AND TENSION STANDS—
Acrometal Products, Inc., Minneapolis, Minn.
Mettler Machine Tool, Inc., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Company Div., The American Pulley Co., Garrett, Ind.
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company Div., The American Pulley Co., Garrett, Ind.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Republic Steel Corp., Berger Div., Canton, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Inc., Pine River, Minn.
Hubbard Spool Company Div., The American Pulley Co., Garrett, Ind.

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
Hubbard Spool Company Div., The American Pulley Co., Garrett, Ind.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark Manufacturing Co., J. L., Rockford, Illinois.
Hubbard Spool Company Div., The American Pulley Co., Garrett, Ind.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
New York Engineering Corp., Yonkers, N. Y.
Republic Steel Corp., Berger Div., Canton, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS—Steel, for Rope and Cable
New York Engineering Corp., Yonkers, N. Y.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Company Div., The American Pulley Co., Garrett, Ind.
Molded Fiber Glass Tray Co., Linesville, Pa.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Nelson Co., The, Baltimore, Md.
Republic Steel Corp., Berger Div., Canton, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Wood
American Wood Working Co., Montello, Wisc.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Company Div., The American Pulley Co., Garrett, Ind.
Nelson Co., The, Baltimore, Md.

REFRACTIONS—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
(See OVENS—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio

RODS—Wire—Non-Ferrous
Platt Bros. & Co., The, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.

RODS—Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Niederrheinische Huette, A. G., Duisburg, Germany
Pan American Trade Development Corp. New York, N. Y.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

ROPE—Wire
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons, Div. Colorado Fuel & Iron Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See COMPOUNDS—RUST Removing)

RUST REMOVING COMPOUNDS—
(See COMPOUNDS—RUST Preventing)

SATURATION SYSTEMS—
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y Inc. (used) Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See COMPOUNDS—Wire Drawing)

SPOOLS—For Retail Sale of Wire
Clark Manufacturing Co., J. L., Rockford, Illinois.

SPOOLS—Plastic
Associated American Winding Machinery, Inc, New York, N. Y.

Hubbard Spool Company Div., The American Pulley Co., Garrett, Ind.
Molded Fiber Glass Tray Co., Linesville, Pa.
Plastic Mold & Engineering Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.

STAMPINGS—Steel
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.

STOCK STORAGE SYSTEMS
Jarke Manufacturing Co., Chicago, Illinois

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Roebling's, John A. Sons Div. Colorado Fuel & Iron Corp., Trenton, N. J.

TANKS—Ceramic, for Galvanizing
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, W.-Germany)

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TENSION METERS—for Wire
Boulin Instrument Corporation, Pelham, N. Y.
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
Tensitron, Inc., Harvard, Mass.

TESTERS—INSULATION
(See Testing Equipment—for Dielectric Faults)

TESTING EQUIPMENT — Dielectric Faults in Insulation
Davis Electric Co., Wallingford, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
Peschel Electronics, Inc., Patterson, N. Y.
Wire & Textile Mach'y Inc. (used) Pawtucket, R. I.

TESTING EQUIPMENT — Physical
Scott Testers, Inc., Providence, R. I.

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper Silver and False Gold Coated, etc.
(See TINSEL—Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

TRANSMISSIONS—Variable Speed (See Adjustible Speed Drives)

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Associated American Winding Machinery, Inc., New York, N. Y.
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Hodge Bros. Machine Shop, Ossining, N. Y.
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

VARNISHES & LACQUERS—for Electric Wire
General Electric Company, Insulating Materials Section, Schenectady, N. Y.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.

WAXES—for Insulated Wire
Cary Chemicals, Inc., New Brunswick, N. J.

WELDERS—Spot and Butt and Welding Wire Fabrics
Eisler Engineering Corp., Newark, N. J.
EVG, Maschinen and Stahl, A.G., Zurich, Switzerland
Micro Products Co., Chicago, Ill.
Schlatter, Ltd., H. A., Zollikon-Zurich

WHEELS—for Printing on Electric Wire
Daniels & Co., Frank, New York, N. Y.
Gem Gravure Company, West Hanover, Mass.
Gillies, Duncan M., Co., Inc., West Boylston, Mass.

WIRE—Aluminum
Malin & Co., The, Cleveland, Ohio
Scovill Mfg Co., Waterbury, Conn.

WIRE—Ball
Marathon Specialty Steels, Inc., N. Y., N. Y.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Barbed
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

WIRE—Brass and Bronze
Malin & Co., The, Cleveland, Ohio
Scovill Mfg. Co., Waterbury, Conn.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Bunched and Stranded
Camden Wire Company, Camden, N. Y.

WIRE—Cadmium
Stamford Processing Co., Peekskill, N. Y.

WIRE—Cold Heading
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Scovill Mfg. Co., Waterbury, Conn.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Copper
Camden Wire Company, Camden, N. Y.
Malin & Co., The, Cleveland, Ohio

WIRE—For Electrical Conductors
Camden Wire Company, Camden, N. Y.

WIRE—Flat
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Jones & Laughlin Steel Corp, Stainless and Strip Div., Detroit, Mich.
Montgomery Co., The, Windsor Locks, Conn.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Galvanized
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Pan American Trade Development Corp., New York, N. Y.
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Wickwire Spencer Steel Div., Colorado, Fuel & Iron Corp., New York, N. Y.

WIRE—High Carbon
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Detroit Steel Corporation, Detroit, Mich.
Marathon Specialty Steels, Inc., New York, N. Y.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Manufacturers
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Marathon Specialty Steels, Inc., N. Y., N. Y.
Republic Steel Corp., Berger Div., Canton, Ohio
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Scovill Mfg. Co., Waterbury, Conn.
U. S. Steel Corp., N. Y., N. Y.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Metalizing
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Platt Bros & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WIRE—Music
Malin & Co., The, Cleveland, Ohio
Suzuki Metal Industry Co., Ltd., Tokyo, Japan

WIRE—Needle
Marathon Specialty Steels, Inc., New York, N. Y.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Nickel Alloy
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Nickel Silver and Phosphor Bronze
Malin & Co., The, Cleveland, Ohio
Wisconsin Wire Works, Appleton, Wis.

WIRE—Oil Tempered
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Malin & Co., The, Cleveland, Ohio
Pan American Trade Development Corp., New York, N. Y.
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Suzuki Metal Industry Co., Ltd., Tokyo, Japan
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE Prestressed Concrete Reinforcement
Suzuki Metal Industry Co., Ltd., Tokyo, Japan

WIRE—Special Shapes
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Spring
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Marathon Specialty Steels, Inc., N. Y., N. Y.
Pan American Trade Development Corp., New York, N. Y.
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Suzuki Metal Industry Co., Ltd., Tokyo, Japan
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Stainless Steel
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Malin & Co., The, Cleveland, Ohio
Pan American Trade Development Corp., New York, N. Y.
Suzuki Metal Industry Co., Ltd., Tokyo, Japan
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Steel—Also Coppered and Galvanized Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Malin & Co., The, Cleveland, Ohio
Pan American Trade Development Corp., New York, N. Y.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Tire Bead
Suzuki Metal Industry Co., Ltd., Tokyo, Japan

WIRE—Upholstery and Mattress
Pan American Trade Development Corp., New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WOOD—for Guide, Rolls, Bushings, Wear Parts, etc.

WRAPPING PAPER—Creped
(See PAPER—Creped Wrapping)

YARN TESTERS—
National Standard Electronics, Inc., New York, N.Y.
Scott Testers, Inc., Providence, R. I.

YARNS—Wire Insulating
Chadwick Yarn Company, Pawtucket, R. I.
Synthetic Thread Co., Bethlehem, Pa.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 16, NEW JERSEY, U. S. A.

ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE
AND MASTICATING MACHINERY MANUFACTURERS

WATSON

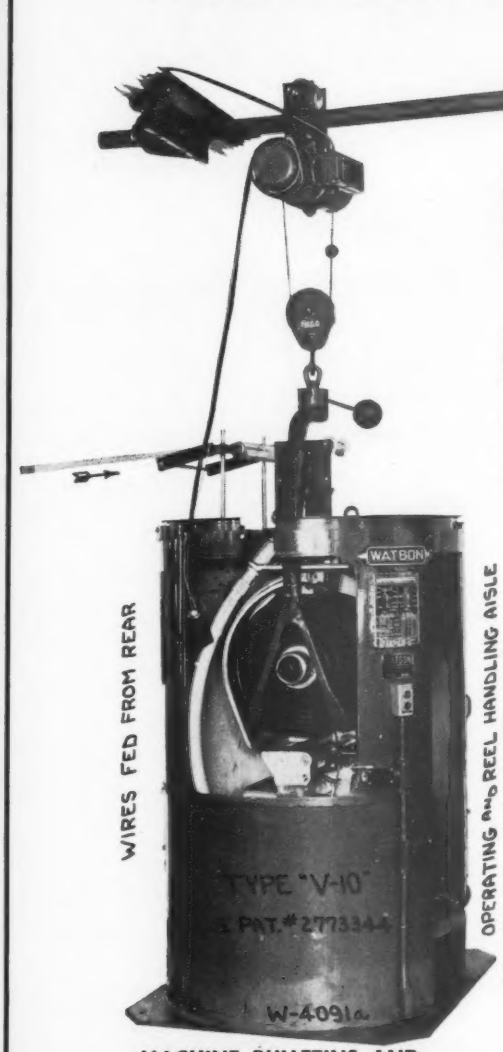
VERTICAL BUNCHERS TYPE "V"

U. S. PATENT 2,773,344

THE LEADING DESIGNS WITH AN INTERNATIONAL REPUTATION

NOTABLE ADVANTAGES:

1.—HIGHEST LONG-RUN OUTPUT ON LARGE STANDARD WIRE REELS.
2.—GREATEST COMPACTNESS. IDEAL FOR ROW GROUPING IN LIMITED SPACE.
3.—LABOR-SAVING. ONE OPERATOR CAN SERVE MANY MACHINES.
4.—QUICKEST PARTS SERVICE FROM CATALOGUED STOCK.
5.—LOWEST MACHINE COST DUE TO QUANTITY MANUFACTURE.



MACHINE BULLETINS AND PRICES UPON REQUEST

SUITABLE FOR ALL COMMON BUNCHING WORK, AND USED ALSO FOR BUNCH-STRANDING AND CABLING OF STEEL AND ALUMINUM CLOTHESLINE, TELEVISION GUY WIRE, SEALING STRANDS, METAL FISH LINES, PAPER CORD, CONTINUOUS TWISTS OF FLAT WIRE, SMALL PLASTIC INSULATED CABLES, ANNUNCIATOR WIRES, PLASTIC CORDS, AND MANY OTHER PRODUCTS WHICH WOULD ORDINARILY REQUIRE THE USE OF MUCH MORE EXPENSIVE PROCESSING EQUIPMENT.

GENERAL SPECIFICATIONS

CONSTRUCTION: STEEL, HIGH STRENGTH ALLOYS AND BALL BEARING THROUGHOUT. MECHANISM HOUSED IN RIGID STEEL FRAME WITH SAFETY DOOR OPENING MACHINE SHUT-OFF.

NO INSTALLATION WORK REQUIRED.

STANDARD REELS:
No. 7—16" x 8", 250 LB. CU. CAPACITY
No. 9—22" x 11", 650 LB. CU. CAPACITY
No. 10—24" x 14", 1000 LB. CU. CAPACITY

AVAILABLE LAYS: FROM 1/8" TO 5". RIGHT AND LEFT HAND TWIST. LAYS ARE FIXED AS SET. NO LAY WANDERING.

ELECTRICALS: MOTORS, CONTROLS AND LOW VOLTAGE ELECTRIC STOPS ARE BUILT IN AND WIRED FOR OPERATION.

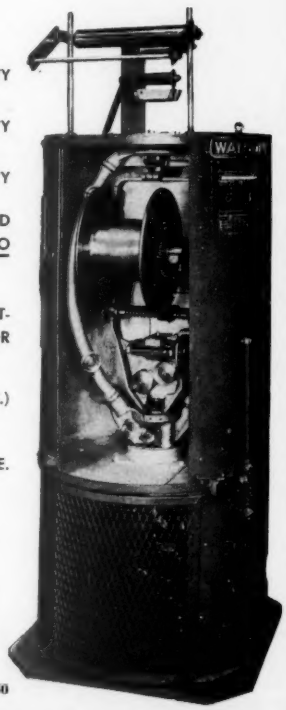
STRAND SIZE RANGE: FROM FINE (7 x #34 B. & S.) TO 5/16" DIAMETER STRANDS.

WIRE FEED POINTS: FROM FRONT, REAR OR SIDE.

DELIVERIES: FROM STOCK.

SHIPMENTS: DOMESTIC—F.O.B. PATERSON, N.J.
FOREIGN—BOXED & DELIVERED TO NEW YORK HARBOR.

★ ★ ★



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"better machinery for the wire industry"...

A phrase that becomes a fact with every installation of Syncro Machine Company Equipment. Syncro's complete line of modern high-speed wire and cable mill machinery represents 30 years of industry leadership. Our familiar triangle is your assurance Syncro will continue to meet today's requirements by anticipating tomorrow's demands.

Our engineers welcome the opportunity to give you further information on how SYNCRO can help meet your plant's wire and cable production requirements. Write Syncro Machine Company, Dept. C, Perth Amboy, New Jersey.

Syncro Model J-21 Rod Breakdown Machine. Maximum entering rod size 5/16" soft copper —finishing size 8 to 24 gauge—drawn at maximum operating speeds.

affiliated company. Winget Syncro Ltd. Rochester, Kent, England.

wire drawing machines • stranders • continuous electric annealers • payoffs • capstans • wire insulators • heavy duty takeups • tapers • special machinery